

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Carla Wern Examiner #: 71724 Date: 12-12-05
 Art Unit: 1745 Phone Number: 27294 Serial Number: 10/04/2004
 Mail Box and Bldg/Room Location: 663 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

 Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: _____
 Inventors (please provide full names): See Front Sheet

Earliest Priority Filing Date: _____

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Can you search for a cell comprising a non-aqueous electrolyte comprising 2.5% by vol of phosphorene derivative of formula (2) where R⁴ is a halogen atom & n is between 3-15.

If can't find anything then search for when it is Formula (1).

Thanks,
 Carla

SCIENTIFIC REFERENCE BR
 Sci & Tech Inf. Ctr.

DEC 13 RECD

Pat. & T.M. Office

STAFF USE ONLY

Staff Use Only	Type of Search	Vendors and cost where applicable
Searcher: <u>EL</u>	NA Sequence (#) _____	STN _____
Searcher Phone #: _____	AA Sequence (#) _____	Dialog _____
Searcher Location: _____	Structure (#) _____	Questel/Orbit _____
Date Searcher Picked Up: _____	Bibliographic _____	Dr. Link _____
Date Completed: <u>12-15-05</u>	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: _____	Fulltext _____	Sequence Systems _____
Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: _____	Other _____	Other (specify) _____

Amendments to the Claims:

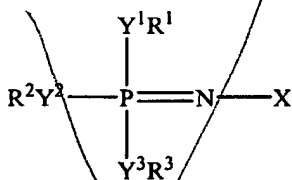
The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A non-aqueous electrolyte cell comprising a non-aqueous electrolyte that contains lithium ions and more than 2.5 % by volume of a phosphazene derivative having a flash point of not lower than 100°C, and a positive electrode, and a negative electrode capable of absorbing and releasing lithium;

wherein the phosphazene derivative is a liquid at room temperature;

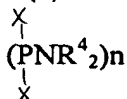
wherein the phosphazene derivative is represented by any of the following general formula (1) or (2):

Formula (1)



wherein R^1 , R^2 and R^3 each represents a monovalent substituent or a halogen element; X represents an organic group containing at least one element selected from carbon, silicon, germanium, tin, nitrogen, phosphorus, arsenic, antimony, bismuth, oxygen, sulfur, selenium, tellurium and polonium; and Y^1 , Y^2 and Y^3 each represent a divalent linking group, a divalent element or a single bond; and in at least one of Y^1R^1 , Y^2R^2 and Y^3R^3 , Y is a single bond and R is a halogen atom;

Formula (2)



wherein each R^4 is chosen from a monovalent substituent and a halogen element, and at least one R^4 represents a halogen element atom; and n falls between 3 and 15.

2. (Original) The non-aqueous electrolyte cell as claimed in claim 1, wherein the viscosity at 25°C of the non-aqueous electrolyte is at most 10 mPa·s (cP).

3. (Original) The non-aqueous electrolyte cell as claimed in claim 1 or 2, wherein the non-aqueous electrolyte contains an aprotic organic solvent.

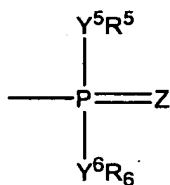
4. (Original) The non-aqueous electrolyte cell as claimed in claim 3, wherein the aprotic organic solvent is a cyclic ester compound.

5. (Original) The non-aqueous electrolyte cell as claimed in claim 4, wherein the cyclic ester compound contains ethylene carbonate or γ -butyrolactone.

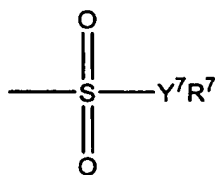
6. (Previously Presented) The non-aqueous electrolyte cell as claimed in claim 4, wherein the cyclic ester compound contains ethylene carbonate, and the non-aqueous electrolyte contains LiPF_6 .

7. (Previously Presented) The non-aqueous electrolyte cell as claimed in claim 1, wherein X in formula (1) is an organic group (A) of the following general formula (3):

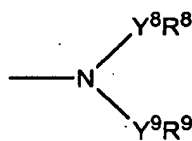
Formula (3)



(A)



(B)



(C)

wherein R^5 to R^9 each represents a monovalent substituent or a halogen element; Y^5 to Y^9 each represents a divalent linking group, a divalent element or a single bond; and Z represents a divalent group or a divalent element.

8. (Currently Amended) A non-aqueous electrolyte secondary cell comprising a non-aqueous electrolyte that contains a supporting salt, an organic solvent and a phosphazene derivative, and a positive electrode, and a negative electrode;

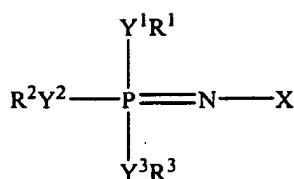
wherein the phosphazene derivative is a liquid at room temperature;

wherein the potential window of the phosphazene derivative is such that its lowermost limit is at most +0.5 V and its uppermost limit is at least +4.5 V,

wherein the potential window of the organic solvent is wider than that of the phosphazene derivative; and

wherein the phosphazene derivative is represented by any of the following general formula (1) or (2):

Formula (1)



wherein R^1 , R^2 and R^3 each represents a monovalent substituent or a halogen element; X represents an organic group containing at least one element selected from carbon, silicon, germanium, tin, nitrogen, phosphorus, arsenic, antimony, bismuth, oxygen, sulfur, selenium, tellurium and polonium; and Y^1 , Y^2 and Y^3 each represent a divalent linking group, a divalent element or a single bond; and in at least one of Y^1R^1 , Y^2R^2 and Y^3R^3 , Y is a single bond and R is a halogen atom;

Formula (2)



wherein ~~each R^4 is chosen from a monovalent substituent and a halogen element, and at least one R^4 is~~represents a halogen element atom; and n falls between 3 and 15.

9. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claim 8, wherein the potential window of the phosphazene derivative is such that its lowermost limit is at most 0 V and its uppermost limit is at least +5 V.

10. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claim 8 or 9, wherein the phosphazene derivative satisfies at least one of the requirements

that (1) its viscosity at 25°C is at most 100 mPa·s (100 cP), (2) its flash point is not lower than 100°C, and (3) its molecular structure has a halogen-containing substituent.

11. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claims 8 or 9, wherein the organic solvent contains an aprotic organic solvent.

12. (Original) The non-aqueous electrolyte secondary cell as claimed in claim 11, wherein the aprotic organic solvent satisfies at least one of the requirements that (1) it contains any of cyclic ester compounds or linear ester compounds, and (2) its viscosity at 25°C is at most 100 mPa·s (100 cP).

13. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claims 8 or 9, wherein the supporting salt contains LiPF_6 , the organic solvent contains ethylene carbonate, and the phosphazene derivative content of the non-aqueous electrolyte falls between 1.5 and 2.5 % by volume.

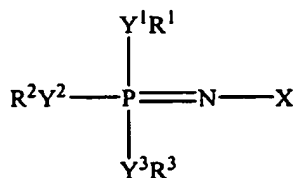
14. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claims 8 or 9, wherein the supporting salt contains LiPF_6 , the organic solvent contains ethylene carbonate, and the phosphazene derivative content of the non-aqueous electrolyte is larger than 2.5 % by volume.

15. (Currently Amended) A non-aqueous electrolyte secondary cell comprising a non-aqueous electrolyte that contains a supporting salt and a phosphazene derivative of which the electroconductivity in a lithium salt solution (0.5 mol/liter) is at least 2.0 mS/cm, and a positive electrode, and a negative electrode;

wherein the phosphazene derivative is a liquid at room temperature; and

wherein the phosphazene derivative is represented by any of the following general formula (1) or (2):

Formula (1)



wherein R^1 , R^2 and R^3 each represents a monovalent substituent or a halogen element; X represents an organic group containing at least one element selected from carbon, silicon, germanium, tin, nitrogen, phosphorus, arsenic, antimony, bismuth, oxygen, sulfur, selenium, tellurium and polonium; and Y^1 , Y^2 and Y^3 each represent a divalent linking group, a divalent element or a single bond; and in at least one of Y^1R^1 , Y^2R^2 and Y^3R^3 , Y is a single bond and R is a halogen atom;

Formula (2)



wherein each R^4 is chosen from a monovalent substituent and a halogen element, and at least one R^4 is represents a halogen element atom; and n falls between 3 and 15.

16. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claim 15, wherein the electorconductivity of the phosphazene derivative in a lithium salt solution (0.5 mol/liter) is at least 4.0 mS/cm.

17. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in any of claims 15 or 16, wherein the supporting salt contains $LiPF_6$, the non-aqueous electrolyte contains ethylene carbonate, and the phosphazene derivative content of the non-aqueous electrolyte falls between 1.5 and 2.5 % by volume.

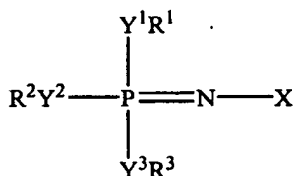
18. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in any of claims 15 or 16, wherein the supporting salt contains $LiPF_6$, the non-aqueous electrolyte contains ethylene carbonate, and the phosphazene derivative content of the non-aqueous electrolyte is larger than 2.5 % by volume.

19. (Currently Amended) A non-aqueous electrolyte secondary cell comprising a non-aqueous electrolyte that contains a supporting salt and a phosphazene derivative whose dielectric constant at 25°C is at least 15 and the viscosity is at most 20 mPa·s (20 cP), and a positive electrode, and a negative electrode;

wherein the phosphazene derivative is a liquid at room temperature; and

wherein the phosphazene derivative is represented by any of the following general formula (1) or (2):

Formula (1)



wherein R^1 , R^2 and R^3 each represents a monovalent substituent or a halogen element; X represents an organic group containing at least one element selected from carbon, silicon, germanium, tin, nitrogen, phosphorus, arsenic, antimony, bismuth, oxygen, sulfur, selenium, tellurium and polonium; and Y^1 , Y^2 and Y^3 each represent a divalent linking group, a divalent element or a single bond; and in at least one of Y^1R^1 , Y^2R^2 and Y^3R^3 , Y is a single bond and R is a halogen atom;

Formula (2)



wherein each R^4 is chosen from a monovalent substituent and a halogen element, and at least one R^4 is represents a halogen element atom; and n falls between 3 and 15.

20. (Previously Presented) The non-aqueous electrolyte secondary cell as claimed in claim 19, wherein the dielectric constant at 25°C of the phosphazene derivative is at least 30.

Patent for Invention



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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20530
www.uspto.gov



Bib Data Sheet

CONFIRMATION NO. 8751

SERIAL NUMBER 10/048,054	FILING DATE 01/25/2002 RULE	CLASS 429	GROUP ART UNIT 1745	ATTORNEY DOCKET NO. 111788
APPLICANTS Masashi Otsuki, Tokyo, JAPAN; Shigeki Endo, Tokorozawa-shi, JAPAN; Takao Ogino, Tokorozawa-shi, JAPAN;				
** CONTINUING DATA ** <i>le</i> THIS APPLICATION IS A 371 OF PCT/JP00/05053 07/28/2000				
** FOREIGN APPLICATIONS ** <i>le</i> JAPAN 11/214814 07/29/1999 JAPAN 11/334957 11/25/1999 JAPAN 11/334958 11/25/1999 JAPAN 11/334959 11/25/1999 JAPAN 2000/126566 04/26/2000 JAPAN 2000/128240 04/27/2000 <i>(except)</i> JAPAN 2000/128241 04/27/2000 JAPAN 2000/128242 04/27/2000				
Foreign Priority claimed <input checked="" type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 (a-d) conditions <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after met Allowance Verified and <i>Hea Van le</i> Acknowledged Examiner's Signature Initials		STATE OR COUNTRY JAPAN	SHEETS DRAWING	TOTAL CLAIMS 20 INDEPENDENT CLAIMS 4
ADDRESS Oliff & Berridge P O Box 19928 Alexandria, VA 22320				
TITLE Nonaqueous electrolyte secondary cell				
FILING FEE RECEIVED 1470	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit	

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FILE 'LREGISTRY' ENTERED AT 12:40:19 ON 15 DEC 2005
L1 STR

FILE 'HCAPLUS' ENTERED AT 13:06:51 ON 15 DEC 2005
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L3 26510 S ENDO ?/AU
L4 6139 S OGINO ?/AU
L5 19 S L2 AND L3 AND L4
L6 693 S OTSUKI M?/AU
L7 2487 S ENDO S?/AU
L8 1101 S OGINO T?/AU
L9 19 S L6 AND L7 AND L8
SEL L9 1-19 RN

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L11 15 S L10 AND P/ELS
L12 12 S L10 AND X/ELS

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L14 8 S L11 AND L12 AND L13

FILE 'HCA' ENTERED AT 13:24:00 ON 15 DEC 2005
L15 204 S L14
L16 213946 S BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY? OR
L17 17 S L15 AND L16
L18 452387 S ELECTROLY?
L19 44316 S NONAQ# OR NONAQUEOUS? OR NONWATER? OR NONH2O OR NON(A) (
L20 17 S L15 AND L18
L21 12 S L15 AND L19
L22 18 S L17 OR L20 OR L21

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L23 50 S L1
L24 2860 S L1 FUL
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L25 STR L1
L26 50 S L25 SSS SAM SUB=L24
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FILE 'HCA' ENTERED AT 13:42:58 ON 15 DEC 2005

L28 2670 S L27
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L33 112 S L28 AND L18
L34 16 S L28 AND L19
L35 94 S L29 AND L16
L36 113 S L29 AND L18
L37 17 S L29 AND L19
L38 10 S L35 AND L36 AND L37
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L40 27 S L22 OR L38
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L43 41 S L41 AND (1840-2000/PY OR 1840-2000/PRY)

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NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 3

STEREO ATTRIBUTES: NONE

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L25 STR

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{ 2
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 DEFAULT ECLEVEL IS LIMITED

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 NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE
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100.0% PROCESSED 1994 ITERATIONS 1912 ANSWERS
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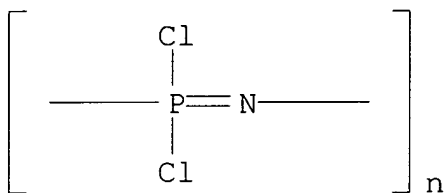
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=> d l42 1-8 cbib abs hitstr hitind

L42 ANSWER 1 OF 8 HCA COPYRIGHT 2005 ACS on STN
 136:234721 **Nonaqueous electrolyte** secondary lithium
battery containing phosphazene polymer **electrolyte**
 and lithium manganate cathode active mass. Terashima, Hideki;
 Fukushima, Gen; Fui, Samu (Sony Corp., Japan). Jpn. Kokai Tokkyo
 Koho JP 2002075444 A2 20020315, 14 pp. (Japanese). CODEN: JKXXAF.
 APPLICATION: JP 2000-261276 20000830.
 AB The **battery** has a cathode contg. $\text{Li} + \text{XMYMn}_2 - \text{X} - \text{YO}_4$ (M =
 metal other than Li and Mn; X = 0-0.15; Y = 0-0.3) as an active
 material and a **nonaq. electrolyte** contg. a
 phosphazene deriv. $[\text{P}(\text{OR}_1)(\text{OR}_2):\text{N}]_n$ [R1, R2 = (substituted) linear
 or branched alkyl, (substituted) satd. cyclic alkyl, (substituted)]

alkylene, alkylene oxide; n = 1-100]. The **battery** shows high capacity and energy d. under high temp. condition.

- IT **26085-02-9D**, Poly(dichlorophosphazene), (fluoro)alkyl group-contg.
 (**nonaq. electrolyte** secondary lithium **battery** contg. phosphazene polymer **electrolyte** and lithium manganate cathode active mass)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M010-40
 ICS H01M010-40; H01M004-02; H01M004-58
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38
- ST **nonaq** phosphazene polymer **electrolyte** lithium **battery**; spinel lithium manganese oxide cathode lithium **battery**
- IT Polyphosphazenes
 ((fluoro)alkyl; **nonaq. electrolyte** secondary lithium **battery** contg. phosphazene polymer **electrolyte** and lithium manganate cathode active mass)
- IT Polyphosphazenes
 (cyclic oligomer, (fluoro)alkyl; **nonaq. electrolyte** secondary lithium **battery** contg. phosphazene polymer **electrolyte** and lithium manganate cathode active mass)
- IT Secondary **batteries**
 (lithium; **nonaq. electrolyte** secondary lithium **battery** contg. phosphazene polymer **electrolyte** and lithium manganate cathode active mass)
- IT **Battery** cathodes
 Polymer **electrolytes**
 (**nonaq. electrolyte** secondary lithium **battery** contg. phosphazene polymer **electrolyte** and lithium manganate cathode active mass)
- IT 7440-44-0, Carbon, uses
 (anode; **nonaq. electrolyte** secondary lithium **battery** contg. phosphazene polymer **electrolyte** and lithium manganate cathode active mass)
- IT **26085-02-9D**, Poly(dichlorophosphazene), (fluoro)alkyl

group-contg.

(**nonaq. electrolyte** secondary lithium
battery contg. phosphazene polymer **electrolyte**
and lithium manganate cathode active mass)

IT 12057-17-9P, Lithium manganese oxide (LiMn₂O₄)

(**nonaq. electrolyte** secondary lithium
battery contg. phosphazene polymer **electrolyte**
and lithium manganate cathode active mass)

L42 ANSWER 2 OF 8 HCA COPYRIGHT 2005 ACS on STN

136:203115 Additive for secondary **nonaqueous**

electrolyte battery and double layer capacitor,
the **battery**, and the capacitor. Otsuki, Masashi; Endo,
Shigeki; Ogino, Takao (Bridgestone Corporation, Japan). PCT Int.
Appl. WO 2002021631 A1 20020314, 35 pp. DESIGNATED STATES: W: AE,
AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR,
CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,
ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV,
MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE,
SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW,
AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH,
CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR,
NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2.
APPLICATION: WO 2001-JP7692 20010905. PRIORITY: JP 2000-272082
20000907; JP 2000-272083 20000907.

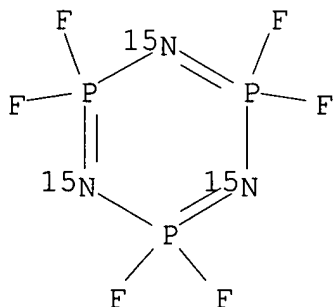
AB The additive contains a phosphazene deriv. (PNF₂)₃-14.

IT **72924-67-5**

(cyclic phosphazene additives in **nonaq.**
electrolyte solns. for secondary lithium
batteries and double layer capacitors)

RN 72924-67-5 HCA

CN 1,3,5,2,4,6-Triazatriphosphorine-1,3,5-¹⁵N₃, 2,2,4,4,6,6-hexafluoro-
2,2,4,4,6,6-hexahydro- (9CI) (CA INDEX NAME)



IC ICM H01M010-40

ICS H01M006-16; H01G009-038

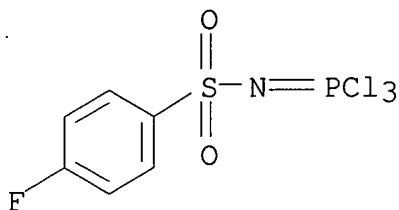
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

- ST secondary **nonaq battery** phosphazene deriv
additive; double layer capacitor phosphazene deriv additive
- IT **Battery electrolytes**
(cyclic phosphazene additives in **nonaq.**
electrolyte solns. for secondary lithium
batteries)
- IT Cyclophosphazenes
(cyclic phosphazene additives in **nonaq.**
electrolyte solns. for secondary lithium
batteries and double layer capacitors)
- IT Capacitors
(double layer; cyclic phosphazene additives in **nonaq.**
electrolyte solns. for double layer capacitors)
- IT 108-32-7, Propylene carbonate 429-06-1, Tetraethylammonium
tetrafluoroborate
(cyclic phosphazene additives in **nonaq.**
electrolyte solns. for double layer capacitors)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate
14283-07-9, Lithium fluoroborate 21324-40-3, Lithium
hexafluorophosphate
(cyclic phosphazene additives in **nonaq.**
electrolyte solns. for secondary lithium
batteries)
- IT **72924-67-5**
(cyclic phosphazene additives in **nonaq.**
electrolyte solns. for secondary lithium
batteries and double layer capacitors)
- L42 ANSWER 3 OF 8 HCA COPYRIGHT 2005 ACS on STN
136:20156 Preparation of sulfonyl-containing phosphazenes. Narita,
Yukio; Saito, Tadashi; Ohara, Nobuhiko; Wakui, Atsushi; Kamata,
Tomohisa (Nippon Chemical Industrial Co., Ltd., Japan). Jpn. Kokai
Tokkyo Koho JP 2001335590 A2 20011204, 7 pp. (Japanese). CODEN:
JKXXAF. APPLICATION: JP 2000-157053 20000526.
- AB The title (R1O)3P:NSO2R2 [R1 = (CH2CH2O)nMe which may be substituted
with halo (n = 1-5); R2 = C1-12 (halo)alkyl, (halo)phenyl, C1-4
alkyl-(halo)phenyl] (I), useful as **electrolytes** for
nonaq. secondary batteries, flame retardants for
lubricants, etc., are prepd. by treating phosphorus pentahalides
with H2NSO2R2 (R2 = same as above) and then treating the resulting
X3P:NSO2R2 (R2 = same as above; X = halo) (II) with R1OM (R1 = same
as above; M = alkali metal). E.g., a mixt. of PCl5, PhSO2NH2,
toluene, and THF was stirred at room temp. for 2.5 h to give 96.9%
II (R2 = Ph, X = Cl) (III). An alcoholate soln., prepd. from
MeOCH2CH2OH and NaH in THF, was added dropwise to a mixt. of III and
toluene at 0-10.degree. and then the reaction mixt. was stirred at
room temp. for 3.5 h to give 78.4% I (R1 = CH2CH2OMe, R2 = Ph).
- IT **1525-81-1P**, N-4-Fluorobenzenesulfonyl-P,P,P-

trichlorophosphazene **5666-55-7P**,
 Trichlorophosphazosulfonylbenzene **29651-24-9P**
377780-52-4P, N-2,4-Difluorobenzenesulfonyl-P,P,P-
 trichlorophosphazene
 (prepn. of phosphazosulfonyl compds. as **electrolytes**
 for **nonaq.** secondary **batteries**)

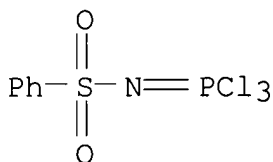
RN 1525-81-1 HCA

CN Phosphorimidic trichloride, [(4-fluorophenyl)sulfonyl]- (9CI) (CA INDEX NAME)



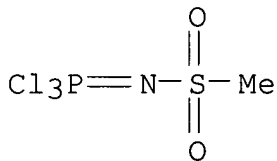
RN 5666-55-7 HCA

CN Phosphorimidic trichloride, (phenylsulfonyl)- (6CI, 8CI, 9CI) (CA INDEX NAME)



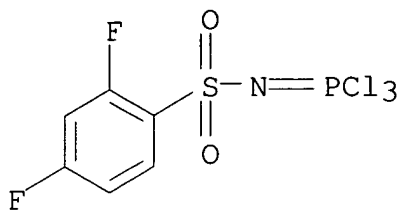
RN 29651-24-9 HCA

CN Phosphorimidic trichloride, (methylsulfonyl)- (8CI, 9CI) (CA INDEX NAME)



RN 377780-52-4 HCA

CN Phosphorimidic trichloride, [(2,4-difluorophenyl)sulfonyl]- (9CI) (CA INDEX NAME)



- IC ICM C07F009-24
ICS H01G009-038; H01G009-035; H01M006-16; H01M010-40
- CC 29-7 (Organometallic and Organometalloidal Compounds)
Section cross-reference(s): 52
- ST methoxyethylphosphazosulfonylbenzene prepn **electrolyte**
nonaq secondary **battery**; phosphazosulfonyl compd
prepn **electrolyte nonaq** secondary
battery; phosphorus pentahalide condensation sulfonamide;
halophosphazosulfonyl compd condensation glycol ether alcoholate
- IT **Battery electrolytes**
(prepn. of phosphazosulfonyl compds. as **electrolytes**
for **nonaq.** secondary **batteries**)
- IT Phosphazenes
(prepn. of phosphazosulfonyl compds. as **electrolytes**
for **nonaq.** secondary **batteries**)
- IT 111-77-3P, Diethylene glycol monomethyl ether **1525-81-1P**,
N-4-Fluorobenzenesulfonyl-P,P,P-trichlorophosphazene
5666-55-7P, Trichlorophosphazosulfonylbenzene 19278-10-5P,
Diethylene glycol monomethyl ether sodium salt **29651-24-9P**
377780-52-4P, N-2,4-Difluorobenzenesulfonyl-P,P,P-
trichlorophosphazene
(prepn. of phosphazosulfonyl compds. as **electrolytes**
for **nonaq.** secondary **batteries**)
- IT 377780-53-5P 377780-54-6P 377780-55-7P 377780-56-8P
(prepn. of phosphazosulfonyl compds. as **electrolytes**
for **nonaq.** secondary **batteries**)
- IT 98-10-2, Benzenesulfonamide 109-86-4, Ethylene glycol monomethyl
ether 402-46-0, 4-Fluorobenzenesulfonamide 3139-99-9, Ethylene
glycol monomethyl ether sodium salt 3144-09-0, Methanesulfonamide
10026-13-8, Phosphorus pentachloride 13656-60-5,
2,4-Difluorobenzenesulfonamide
(prepn. of phosphazosulfonyl compds. as **electrolytes**
for **nonaq.** secondary **batteries**)
- L42 ANSWER 4 OF 8 HCA COPYRIGHT 2005 ACS on STN
134:165659 Secondary **nonaqueous electrolyte**
batteries. Otsuki, Masahi; Endo, Shigeki; Ogino, Takao
(Bridgestone Corp., Japan). PCT Int. Appl. WO 2001009973 A1
20010208, 53 pp. DESIGNATED STATES: W: KR, US; RW: AT, BE, CH, CY,

DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese).
 CODEN: PIXXD2. APPLICATION: WO 2000-JP5053 20000728. PRIORITY: JP
 1999-214814 19990729; JP 1999-334957 19991125; JP 1999-334958
 19991125; JP 1999-334959 19991125; JP 2000-126566 20000426; JP
 2000-128240 20000427; JP 2000-128241 20000427; JP 2000-128242
 20000427.

GI

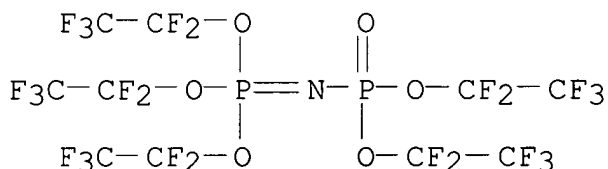


AB The **batteries** have cathodes, Li intercalating anodes, and a **nonaq. electrolyte** soln. contg. Li⁺ and a phosphazene deriv. having flash point .gtoreq.100.degree.. Preferably, the phosphazene is I (R¹-3 = monovalent substituent or halogen; X = org. group contg. C, Si, Ge, Sn, N, P, F, Sb, Bio, O, S, Se, Te, and/or Po; and Y¹-3 = single bond, bivalent element or connection group) or (PNR⁴₂)_n (R⁴ = monovalent substituent or halogen, n = 3-15).

IT **324575-25-9**
 (phosphazene derivs. with controlled flash point in **electrolyte** solns. for secondary lithium **batteries**)

RN 324575-25-9 HCA

CN Phosphorimidic acid, [bis(pentafluoroethoxy)phosphinyl]-, tris(pentafluoroethyl) ester (9CI) (CA INDEX NAME)



IC H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery electrolyte**
 phosphazene flash point

IT **Battery electrolytes**
 (compsn. of **electrolyte** solns. contg. phosphazene derivs. with controlled flash point for secondary lithium **batteries**)

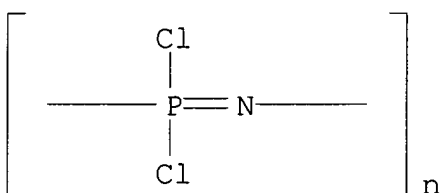
- IT 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate
105-58-8, Diethyl carbonate 14283-07-9, Lithium fluoroborate
21324-40-3, Lithium hexafluorophosphate
(comps. of **electrolyte** solns. contg. phosphazene
derivs. with controlled flash point for secondary lithium
batteries)
- IT 2397-48-0 **324575-25-9**
(phosphazene derivs. with controlled flash point in
electrolyte solns. for secondary lithium
batteries)

L42 ANSWER 5 OF 8 HCA COPYRIGHT 2005 ACS on STN

128:117381 **Nonaqueous electrolyte batteries**

having phosphorus nitride chloride polymer anodes. Nishida,
Nobumichi; Kamino, Maruo; Yamazaki, Kanya; Noma, Toshiyuki; Nishio,
Akiji (Sanyo Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP
09330721 A2 19971222 Heisei, 5 pp. (Japanese). CODEN:
JKXXAF. APPLICATION: JP 1996-173057 19960611.

- AB The **batteries** have anodes using PNC12 polymers. The use
of the polymers improves charge-discharge capacity and prevents the
anodes from reacting with **nonaq. electrolytes**,
so that the **batteries** have improved performance in storage
and cycle.
- IT **26085-02-9P**, Poly[nitrilo(dichlorophosphoranylidene)]
(**nonaq. battery** phosphorus nitride chloride
polymer anodes for storage and cycle performance)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



Anode Not
electrolyte

- IC ICM H01M004-58
ICS H01M004-02; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST **battery** anode phosphorus nitride chloride polymer
- IT **Battery** anodes
(**nonaq. battery** phosphorus nitride chloride
polymer anodes for storage and cycle performance)
- IT **26085-02-9P**, Poly[nitrilo(dichlorophosphoranylidene)]
(**nonaq. battery** phosphorus nitride chloride
polymer anodes for storage and cycle performance)

L42 ANSWER 6 OF 8 HCA COPYRIGHT 2005 ACS on STN

120:303349 **Nonaqueous electrolyte batteries**

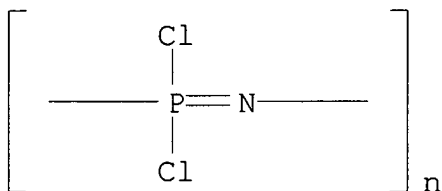
using improved **electrolytes**. Kajiwara, Naruyuki; Ogino, Takao; Myazaki, Tadaaki; Kawagoe, Takahiro (Bridgestone Corp, Japan). Jpn. Kokai Tokkyo Koho JP 06013108 A2 **19940121** Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1993-92204 19930326. PRIORITY: JP 1992-115284 19920409.

AB In the **batteries** having cathodes, Li-intercalatable anodes, and Li+-contg. **nonaq. electrolytes**, the **electrolytes** comprise solns. of phosphazene derivs. having viscosity at 25.degree. of .ltoreq.300 cP and dissolving Li salts. The **batteries** are free from bursting and firing in short circuit, and have high voltage, discharge capacity, etc.

IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with fluorinated and nonfluorinated propanol (cyclic, oligomeric, **electrolytes** contg. lithium salts and, with limited viscosity, for **batteries**, for safety)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery electrolyte** phosphazene deriv safety

IT Safety

(in **batteries**, **electrolytes** contg. phosphazene derivs. and lithium salts for)

IT **Battery electrolytes**

(lithium salts and phosphazene derivs. in, for safety)

IT Phosphonitrile compounds

(phosphazenes, **electrolytes** contg. lithium salts and, with limited viscosity, for **batteries**, for safety)

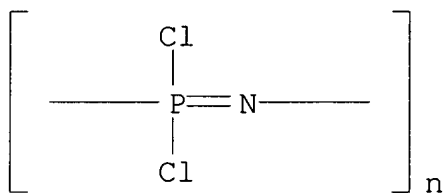
IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with fluorinated and nonfluorinated propanol
26085-02-9D, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with propanol

(cyclic, oligomeric, **electrolytes** contg. lithium salts and, with limited viscosity, for **batteries**, for safety)

IT 155270-25-0

(**electrolytes** contg. lithium salts and, with limited viscosity, for **batteries**, for safety)

- IT 7439-93-2D, Lithium, salts 21324-40-3
(**electrolytes** contg. phosphazene derivs. and, for
batteries, for safety)
- L42 ANSWER 7 OF 8 HCA COPYRIGHT 2005 ACS on STN
114:105617 New anions for use in polymer **electrolyte**
rechargeable lithium **batteries**. Dominey, L. A.; Blakley,
T. J.; Koch, V. R. (Covalent Assoc., Inc., Woburn, MA, 01801, USA).
Proceedings of the Intersociety Energy Conversion Engineering
Conference, 25th(Vol. 3), 382-4 (English) **1990**. CODEN:
PIECDE. ISSN: 0146-955X.
- AB Polymer **electrolytes** based on
poly[bis(methoxyethoxyethoxide)phosphazene], and LiC(CF₃SO₂)₃ and
LiN(CF₃SO₂)₂ exhibit room temp. cond. of >1 .times. 10⁻⁴/.OMEGA.-cm.
In both liq. **nonaq.** and solvent-free polymers,
LiC(CF₃SO₂)₃ leads to conductivities higher than any other known
org.-anion based Li salt. A Li/TiS₂ **battery** with the
polymer **electrolyte** demonstrated room-temp. discharge
capability and >70% cathode active material utilization at
70.degree..
- IT **26085-02-9D**, Poly(dichlorophosphazene),
bis(methoxyethoxyethoxy) derivs., lithium complexes
(**electrolyte**, contg. trifluoromethanesulfonylimide or
trifluoromethanesulfonylmethide, for lithium-titanium disulfide
batteries)
- RN 26085-02-9 HCA
CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72, 76
- ST polymer **electrolyte** rechargeable lithium **battery**
; phosphazene polymer **electrolyte** lithium **battery**
; imide lithium polymer **electrolyte battery**;
methide lithium polymer **electrolyte battery**;
trifluoromethanesulfonylmethide **electrolyte**
battery; titanium sulfide polymer **electrolyte**
battery
- IT **Batteries**, secondary
(lithium-titanium disulfide, polyphosphazene **electrolyte**
contg. lithium trifluoromethanesulfonylmethide or lithium

- trifluoromethanesulfonylimide for)
- IT Electric conductivity and conduction
(of polymer **electrolyte** of
(methoxyethoxyethoxide)phosphazene and lithium
tris(trifluoromethanesulfonyl)methide or
bis(trifluoromethanesulfonyl)imide)
- IT Phosphazene polymers
((methoxyethoxy)ethoxy, lithium complexes, **electrolyte**,
contg. trifluoromethanesulfonylimide or
trifluoromethanesulfonylmethide, for lithium-titanium disulfide
rechargeable **batteries**)
- IT 90076-65-6
(**electrolyte** contg. poly[bis(methoxyethoxy)ethoxy
phosphazene and, for lithium-titanium disulfide **batteries**
)
- IT 132404-42-3
(**electrolyte** contg. poly[bis(methoxyethoxy)ethoxy
phosphazene and, for lithium-titanium disulfide rechargeable
batteries)
- IT 7439-93-2D, Lithium, poly[bis(methoxyethoxyethoxide)phosphazene
complexes **26085-02-9D**, Poly(dichlorophosphazene),
bis(methoxyethoxyethoxy) derivs., lithium complexes
(**electrolyte**, contg. trifluoromethanesulfonylimide or
trifluoromethanesulfonylmethide, for lithium-titanium disulfide
batteries)

L42 ANSWER 8 OF 8 HCA COPYRIGHT 2005 ACS on STN

55:98893 Original Reference No. 55:18551f-i,18552a-e Synthesis of
fluorides by metathesis with sodium fluoride. Tullock, C. W.;
Coffman, D. D. (E. I. du Pont de Nemours and Co., Wilmington, DE).
Journal of Organic Chemistry, 25, 2016-19 (Unavailable) **1960**
. CODEN: JOCEAH. ISSN: 0022-3263.

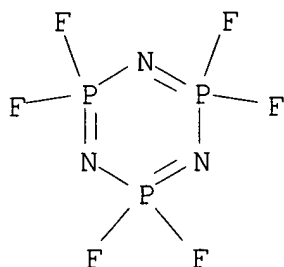
GI For diagram(s), see printed CA Issue.

AB NaF in **nonaq.** tetramethylene sulfone (I), MeCN (II), or
HCONMe₂ (III) exchanged halogen readily with acid chlorides,
.alpha.-chloro ethers, CCl₃SCl, CSCl₂, SeOCl₂, phosphorus
oxychlorides, phosphorus thiochlorides, and phosphonitrilic
chlorides. The majority of the reactions were carried out at atm.
pressure in pyrex glass and the product collected in glass traps
(solid CO₂-Me₂CO), the gaseous products distd. at low temp., and the
liquids fractionated through a spinning band column or a 10-in.
Vigreux column. NaF in I (II, III) was stirred with slow
introduction of the chloro compd. (sum of wts. in g. of 2 components
numerically equal to vol. of medium in ml.) below 100.degree. and
heating begun after addn. of all reactant. CF₃SCl and CF₃SSCF₃ (3:2
by wt.) were obtained in 47% yield by heating NaF with CCl₃SCl in I
at 170-250.degree.. FCOCN was produced in 14% yield by reaction of
COCl₂ at room temp. with NaF in HCN. Conditions for the synthesis

of carbon fluorides were tabulated [reactants (moles), reaction conditions (temp./hrs.), % conversion of chloride to fluoride, and products (b.p.) given]: CSCl_2 (1.03), I (2.18), NaF (2.62), 33-89.degree./1.0, 89-122.degree./3.0, 122-224.degree./0.6, 224-45.degree./0.2, 37, CF_3SSCF_3 (31-5.degree.), CS_2 ; CCl_3SCl (1.09), I (3.16), NaF (4.76), 34-107.degree./0.5, 107-209.degree./1.3, 209-240.degree./2.75, 47, CF_3SCl (-4 to +2.degree.), CF_3SSCF_3 (27-37.degree.); $(\text{NCCl})_3$ (0.67), I (1.85), NaF (2.50), 43-134.degree./0.2, 134-93.degree./0.4, 193-248.degree./0.2, 74, $(\text{NCF})_3$ (72.5-3.5.degree.); ClCH_2OMe (1.29), I (1.33), NaF (1.90), 33-100.degree./1.5, 100-145.degree./1.0, 145-168.degree./0.7, 47, FCH_2OMe (8.0-11.5.degree.); $\text{CH}_2\text{O}.\text{CHCl}.\text{CHCl}.\text{O}.\text{CH}_2$ (0.50), I (1.33), NaF (1.50), 32.93.degree./0.7, 93-143.degree./1.0, 143-73.degree./0.75, 42, $\text{CH}_2\text{O}.\text{CHF}.\text{CHF}.\text{O}.\text{CH}_2$ (28-30.degree./21 mm.); ClCO_2Me (1.00), I (1.33), NaF (2.00), 33-81.degree./0.7, 81-119.degree./1.4, 119-40.degree./1.5, 33, FCO_2Me (35-7.degree.); $(\text{COCl})_2$ (0.50), I (1.33), NaF (2.00), 59-89.degree./1.5, 89-122.degree./2.0, 60, $(\text{COF})_2$ (0-2.degree.), COF_2 ; AcCl (1.02), I (1.33), NaF (2.00), 41-60.degree./1.5, 60-95.degree./2.4, 48, AcF (19-20.5.degree.); BzCl (1.00), I (1.33), NaF (1.50), 29-128.degree./0.4, 128-188.degree./0.5, 188-226.degree./0.6, 226-250.degree./0.4, 62, BzF (157.9.degree.); COCl_2 (2.00), HCN (2.04), NaF (9.52), 25.degree./20 hrs. in 1 l. reactor at autogenous pressure, 14, FCOCN (-20 to -18.degree.), COF_2 ; COF_2 (1.00), HCN (1.00), AcOH (3 drops), 150.degree./3 hrs. in 1 l. reactor and product kept 24 hrs. at 25.degree. in evacuated pressure reactor, 22.5, FCOCN (-22 to -19.degree.). In the syntheses of S and Se oxyfluorides, the reaction media I, II and III were apparently interchangeable: SOCl_2 (0.50), NaF (2.00), II (2.88), 43-69.degree./0.4, 69-80.degree./1.6, 77, SOF_2 (-43 to -36.degree.); SOCl_2 (0.50), NaF (2.00), I (1.58), 44-70.degree./0.5, 70-8.degree./2.0, 52, SOF_2 (-39 to -36.degree.); SO_2Cl_2 (0.50), NaF (2.48), II (3.24), 80.degree./3.5, 64, SO_2FCl (3-7.degree.); SO_2Cl_2 (0.50), NaF (2.00), III (1.93), 52-80.degree./1.1, 80.degree./1.1, 55, 1:2 SO_2F_2 (-49 to -48.degree.)- SO_2ClF (3-6.degree.); SO_2Cl_2 (1.00), NaF (4.00), I (2.50), 60.degree./1.0, 80.degree./1.0, 100-15.degree./0.5, 28, SeOF (30-2.degree./6 mm.). NaF in I exchanged F for Cl bonded to P with formation of phosphorus fluorides: POCl_3 (0.49), NaF (2.00), I (1.33), 48-80.degree./0.4, 80-96.degree./2.8, 96-168.degree./0.5, 168-215.degree./0.5, 215-28.degree./0.2, 43, POF_3 (-44 to -40.degree.); PhPOCl_2 (0.50), NaF (1.50), I (1.33), 75-120.degree./1.8, 65, PhPOF_2 (44.degree./2.5 mm.); PSCl_3 (0.50), NaF (2.00), I (1.33), 37-140.degree./0.6, 140-70.degree./2.7, 53, PSF_3 (-52 to -48.degree.); PhPSCl_2 (0.50), NaF (1.50), I (1.33), 25-89.degree./0.4, 89-107.degree./1.8, 73, PhPSF_2 (47-9.degree./3 mm.); $(\text{PNCI}_2)_3$, 4, 5, 6 (4.31), NaF (32.14), II (34.39), 80.degree./20, 54, $(\text{PNF}_2)_3$ (51-2.degree., n32D 1.3183, m. 29-31.degree.), $(\text{PNF}_2)_4$

(89-9.5.degree., n_{33D} 1.3449, m. 30.degree.); PCl₃ (0.73), NaF (2.74), I (1.85), 47-52.degree./1.0, 52-75.degree./0.6, 75-109.degree./2.5, 18, PF₃ (sample contained 35 mole-% PF₃, 20 mole-% HCl); ClCH₂POCl₂ (0.50), NaF (2.00), I (1.33), 60-175.degree./0.6, 175-94.degree./0.9, 194-230.degree./0.5, 76, ClCH₂POF₂ (112-13.degree., recovered from the mixt. by heating 30-40 min. at 80-100.degree./2-3 mm.). Previously AsF₃, PbF₂, ZnF₂ or SbF₃ were employed to prep. phosphorus fluorides.

IT **15599-91-4**, Phosphonitrile fluoride, trimer
(prepn. of)
RN 15599-91-4 HCA
CN 1,3,5,2,4,6-Triazatriphosphorine, 2,2,4,4,6,6-hexafluoro-2,2,4,4,6,6-hexahydro- (8CI, 9CI) (CA INDEX NAME)



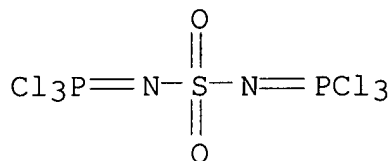
CC 10A (Organic Chemistry: General)
IT 353-50-4, Carbonyl fluoride 359-40-0, Oxalyl fluoride 372-64-5, Disulfide, bis(trifluoromethyl) 421-17-0, Methanesulfonyl chloride, trifluoro- 455-32-3, Benzoyl fluoride 460-22-0, Ether, fluoromethyl methyl 557-99-3, Acetyl fluoride 657-39-6, Phosphonic difluoride, phenyl- 657-40-9, Phosphonothioic difluoride, phenyl- 675-14-9, Cyanuric fluoride 683-55-6, Formyl fluoride, cyano- 1111-98-4, Phosphonic difluoride, (chloromethyl)- 1538-06-3, Formic acid, fluoro-, methyl ester 1550-45-4, p-Dioxane, 2,3-difluoro- 2404-52-6, Thiophosphoryl fluoride 2699-79-8, Sulfuryl fluoride 7783-42-8, Thionyl fluoride 7783-43-9, Selenium oxyfluoride, SeOF₂ 7783-55-3, Phosphorus fluoride, PF₃ 13478-20-1, Phosphoryl fluoride 13637-84-8, Sulfuryl chloride fluoride 14700-00-6, Phosphonitrile fluoride, tetramer **15599-91-4**, Phosphonitrile fluoride, trimer (prepn. of)

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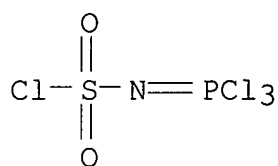
L43 ANSWER 1 OF 41 HCA COPYRIGHT 2005 ACS on STN
134:367047 Preparation of sulfonyl-containing phosphazenes as flame retardants for **battery electrolytes**. Tsuchiya, Tsubasa; Kawakabe, Hiroshi; Wakui, Atsushi; Kamata, Tomohisa (Nippon

Chemical Industrial Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001139584 A2 20010522, 6 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1999-325440 19991116.

- AB Title compds. (R1O)3P:NSO3R1 or (R2O)3P:NSO2N:P(OR2)3 [R1, R2 = (ether-contg.) C1-10 alkyl, haloalkyl] are prepd. by reaction of PX5 (X = halo) with sulfamic acid or sulfamide followed by ROM (R = same as R1 or R2; M = alkali metal). PCl5 was treated with sulfamic acid in PhCl at 100-105.degree. for 12 h to give 68.8% Cl3P:NSO2Cl, which was treated with diethylene glycol monomethyl ether alcoholate in THF at -22 to -20.degree. for 1 day to give 75.2% (MeOC2H4OC2H4O)3P:NSO3C2H4OC2H4OMe.
- IT **14259-65-5P**, Bis(trichlorophosphazo) sulfone
14700-21-1P, Trichlorophosphazosulfonyl chloride
(prepn. of sulfonyl-contg. phosphazenes as flame retardants for **battery electrolytes**)
- RN 14259-65-5 HCA
- CN Phosphorimidic trichloride, sulfonylbis- (9CI) (CA INDEX NAME)

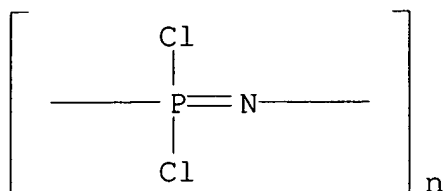


- RN 14700-21-1 HCA
- CN Sulfamoyl chloride, (trichlorophosphoranylidene)- (7CI, 8CI, 9CI)
(CA INDEX NAME)



- IC ICM C07F009-24
ICS C09K021-12
- CC 29-7 (Organometallic and Organometalloidal Compounds)
Section cross-reference(s): 52
- ST sulfonyl phosphazene prepn flame retardant **electrolyte**;
battery electrolyte flame retardant phosphazene
prepn; sulfamic acid reaction phosphorus pentahalide alcoholate;
sulfamide reaction phosphorus pentahalide alcoholate
- IT **Battery electrolytes**
Fireproofing agents
(prepn. of sulfonyl-contg. phosphazenes as flame retardants for **battery electrolytes**)

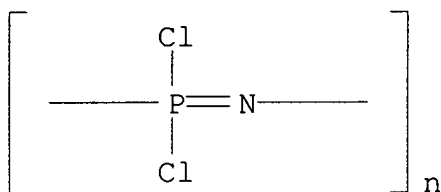
- IT Metal alkoxides
(prepn. of sulfonyl-contg. phosphazenes as flame retardants for
battery electrolytes)
- IT 109-86-4D, Ethylene glycol monomethyl ether, salts 111-77-3D,
Diethylene glycol monomethyl ether, salts 141-52-6, Sodium
ethoxide 5329-14-6, Sulfamic acid 7803-58-9, Sulfamide
10026-13-8, Phosphorus pentachloride
(prepn. of sulfonyl-contg. phosphazenes as flame retardants for
battery electrolytes)
- IT **14259-65-5P**, Bis(trichlorophosphazo) sulfone
14700-21-1P, Trichlorophosphazosulfonyl chloride
(prepn. of sulfonyl-contg. phosphazenes as flame retardants for
battery electrolytes)
- IT 72250-12-5P 271771-13-2P 271771-14-3P 271771-15-4P
(prepn. of sulfonyl-contg. phosphazenes as flame retardants for
battery electrolytes)
- L43 ANSWER 2 OF 41 HCA COPYRIGHT 2005 ACS on STN
133:269455 Solid **electrolyte battery**. Yasuda,
Toshikazu; Noda, Kazuhiro; Horie, Takeshi (Sony Corp., Japan). Eur.
Pat. Appl. EP 1041657 A2 **20001004**, 15 pp. DESIGNATED
STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW.
APPLICATION: EP 2000-106323 20000323. PRIORITY: JP 1999-94149
19990331.
- AB In a solid **electrolyte battery** incorporating a
pos. electrode, a solid **electrolyte** layer formed on the
pos. electrode, and a neg. electrode formed on the solid
electrolyte layer, the solid **electrolyte** layer has
a multi-layer structure having two or more layers, a solid
electrolyte layer of the layers constituting the solid
electrolyte layer having the multi-layer structure which is
nearest the pos. electrode is constituted by a polymer having a
glass transition point of -60.degree. or lower when measurement is
performed by using a differential scanning calorimeter and a no. av.
mol. wt. of 100,000 or larger, and at least one of the layers
constituting the solid **electrolyte** layer having the
multi-layer structure except for the layer nearest the pos.
electrode is formed by crosslinking a polymer solid
electrolyte having a functional group which can be
crosslinked.
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)],
ethoxylated
(**battery** with solid **electrolyte** constituted
by two or more layers)
- RN 26085-02-9 HCA
CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M010-40
ICS C08G079-02
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST **battery** solid **electrolyte**
- IT **Battery electrolytes**
Polymer **electrolytes**
Secondary **batteries**
(**battery** with solid **electrolyte** constituted
by two or more layers)
- IT Fluoropolymers, uses
(binder; **battery** with solid **electrolyte**
constituted by two or more layers)
- IT 7439-93-2, Lithium, uses 12190-79-3, Cobalt lithium oxide colio2
14283-07-9, Lithium tetrafluoroborate **26085-02-9D**,
Poly[nitrilo(dichlorophosphoranylidene)], ethoxylated 115383-11-4
115401-75-7
(**battery** with solid **electrolyte** constituted
by two or more layers)
- IT 7782-42-5, Graphite, uses
(**battery** with solid **electrolyte** constituted
by two or more layers)
- IT 24937-79-9, PvdF
(binder; **battery** with solid **electrolyte**
constituted by two or more layers)
- IT 7429-90-5, Aluminum, uses 7440-50-8, Copper, uses
(current collector; **battery** with solid
electrolyte constituted by two or more layers)
- L43 ANSWER 3 OF 41 HCA COPYRIGHT 2005 ACS on STN
132:323958 Solid polymer **battery electrolyte** and
reactive metal-water **battery**. Harrup, Mason K.; Peterson,
Eric S.; Stewart, Frederick F. (Bechtel BWXT Idaho, LLC, USA). PCT
Int. Appl. WO 2000028609 A1 **20000518**, 21 pp. DESIGNATED
STATES: W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN,
CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID,
IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG,
KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,

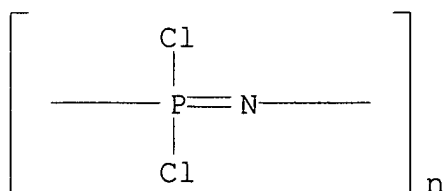
DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US26439 19991109. PRIORITY: US 1998-190039 19981111. *Wd*

- AB A reactive metal-water **battery** includes an anode comprising a metal in at. or alloy form selected from the group consisting of periodic table Group 1A metals, periodic table Group 2A metals and mixts. thereof. The **battery** includes a cathode comprising water. Also included is a solid polymer **electrolyte** comprising a polyphosphazene comprising ligands bonded with a phosphazene polymer backbone. The ligands comprise an arom. ring contg. hydrophobic portion and a metal ion carrier portion. The metal ion carrier portion is bonded at one location with the polymer backbone and at another location with the arom. ring contg. hydrophobic portion. The invention also contemplates such solid polymer **electrolytes** use in reactive metal/water **batteries**, and in any other **battery**.
- IT **26085-02-9**, Dichlorophosphazine polymer
(solid polymer **battery electrolyte** and reactive metal-water **battery**)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M006-18
ICS H01M006-34; H01M004-58
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST polymer **battery electrolyte**; reactive metal water **battery**
- IT **Battery** anodes
 Battery cathodes
 Battery electrolytes
 Primary **batteries**
 (solid polymer **battery electrolyte** and reactive metal-water **battery**)
- IT Alkali metals, uses
Alkaline earth metals
Phosphazenes
Polyethers, uses
Polyoxyalkylenes, uses
Thioethers

- (solid polymer **battery electrolyte** and reactive metal-water **battery**)
- IT 7439-93-2, Lithium, uses 7440-23-5, Sodium, uses 7732-18-5, Water, uses 25322-68-3, Polyethylene oxide 25322-69-4, Polypropylene oxide **26085-02-9**, Dichlorophosphazine polymer
- (solid polymer **battery electrolyte** and reactive metal-water **battery**)
- IT 9036-19-5, Triton X 114
- (solid polymer **battery electrolyte** and reactive metal-water **battery**)
- IT 109-99-9, Thf, uses 111-96-6, Diglyme 14283-07-9, Lithium tetrafluoroborate
- (solid polymer **battery electrolyte** and reactive metal-water **battery**)
- L43 ANSWER 4 OF 41 HCA COPYRIGHT 2005 ACS on STN
- 132:95813 Secondary lithium **batteries**. Shiga, Akira; Aoki, Yoshifumi; Takeichi, Kensuke (Toyota Central Research and Development Laboratories, Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2000030740 A2 **20000128**, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-200672 19980715.
- AB The **batteries** use Li intercalating cathodes, graphitic carbonaceous anodes, and a Li salt **electrolyte** soln.; where the **electrolyte** soln. contains 15-50 vol.% ethylene carbonate and 0.5-2.5 vol.% phosphazene.
- IT **26085-02-9D**, Polydichlorophosphazene, reaction products with sodium ethoxide
- (**electrolyte** solns. with controlled ethylene carbonate and phosphazene contents for secondary lithium **batteries**)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M010-40
- ICS C07D317-38; C09K021-12
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST lithium **battery electrolyte** ethylene carbonate phosphazene
- IT **Battery electrolytes**

(**electrolyte** solns. with controlled ethylene carbonate and phosphazene contents for secondary lithium **batteries**)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 799-83-7
1065-05-0 7108-98-7 21324-40-3, Lithium hexafluorophosphate
26085-02-9D, Polydichlorophosphazene, reaction products with
sodium ethoxide 39528-37-5

(**electrolyte** solns. with controlled ethylene carbonate and phosphazene contents for secondary lithium **batteries**)

L43 ANSWER 5 OF 41 HCA COPYRIGHT 2005 ACS on STN

130:25419 Polyphosphazenes with Novel Architectures: Influence on Physical Properties and Behavior as Solid Polymer

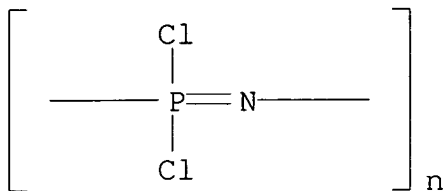
Electrolytes. Allcock, Harry R.; Sunderland, Nicolas J.; Ravikiran, Ramakrishna; Nelson, James M. (Department of Chemistry, The Pennsylvania State University, University Park, PA, 16802, USA). *Macromolecules*, 31(23), 8026-8035 (English) **1998**. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB Three types of polyphosphazenes with different architectures have been synthesized and characterized. The influence of the polymer architecture on solid ionic cond. was of particular interest. The first type includes linear oligo- and polyphosphazenes with the general formula $[N:P(OCH_2CH_2OCH_2CH_2OCH_3)_2]_n$ (MEEP) with different chain lengths. The second type consists of a series of tri-armed star-branched polyphosphazenes with the general formula $N\{CH_2CH_2NH(CF_3CH_2O)_2P[N:P(OCH_2CH_2OCH_2CH_2OCH_3)_2]_n\}_3$ with different arm lengths. These were synthesized via the reaction of the tridentate initiator $[N\{CH_2CH_2NH(CF_3CH_2O)_2P:N-PCl_3\}_3][PCl_6]^-$ with the phosphoranimine $Cl_3P:NSiMe_3$ in CH_2Cl_2 followed by halogen replacement with sodium (methoxyethoxy)ethoxide. The mol. wts. in this system were carefully controlled by variation of the monomer-to-initiator ratios, and the effect of polymer mol. wt. on solid ionic cond. was examd. The third polymer system was designed to examine the effect of complex branching on ionic cond. Thus, a highly branched polymer contg. five branches from a cyclotriphosphazene pendent side group (with 26 ethyleneoxy units per repeat unit) was synthesized. The cond. of this polymer in the presence of three different salts has been measured and compared to the behavior of MEEP with a corresponding mol. wt. The mechanism of ion transport in these systems is discussed.

IT **26085-02-9DP**, Poly(dichlorophosphazene), derivs., lithium complexes **40678-60-2DP**, derivs., lithium complexes
(linear and branched; prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)

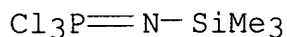
RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



RN 40678-60-2 HCA

CN Phosphorimidic trichloride, (trimethylsilyl)- (9CI) (CA INDEX NAME)



CC 35-7 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 37, 52, 76

IT Polymerization

Polymerization

Polymerization catalysts

Polymerization catalysts

(cationic, living; prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)

IT **Battery electrolytes**

Glass transition temperature

Ionic conductivity

Molecular weight

Polymer **electrolytes**

(prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)

IT 131841-09-3P

(byproduct in prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)

IT 10026-13-8, Phosphorus pentachloride

(catalyst; prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)

IT 33454-82-9, Lithium triflate

(**electrolytes**; prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of

- polyphosphazenes with lithium)
- IT 188186-00-7 216530-14-2
(initiator used as core for branched polyphosphazenes; prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)
- IT 19278-10-5DP, 2-(2-Methoxyethoxy)ethanol sodium salt, reaction products with poly(dichlorophosphazene), lithium complexes
26085-02-9DP, Poly(dichlorophosphazene), derivs., lithium complexes **40678-60-2DP**, derivs., lithium complexes
(linear and branched; prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)
- IT 216530-18-6DP, reaction products with poly(dichlorophosphazene), lithium complexes
(prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)
- IT 7439-93-2DP, Lithium, complexes with polyphosphazenes, preparation
(prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)
- IT 110-87-2 112-27-6 19278-10-5, 2-(2-Methoxyethoxy)ethanol sodium salt
(reactant in prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)
- IT 60221-37-6P 132939-00-5P 216530-17-5P 216530-18-6P
(reactant in prepn. of polyphosphazenes with novel architecture, their phys. properties, and ionic cond. of solid polymer **electrolytes** prepd. by complexation of polyphosphazenes with lithium)

L43 ANSWER 6 OF 41 HCA COPYRIGHT 2005 ACS on STN

129:262843 High conductivity **electrolyte** solutions and secondary **batteries** using the solutions. Angell, Charles Austen; Zhang, Sheng-Shui; Xu, Kang (Arizona Board of Regents, USA). U.S. US 5824433 A **19981020**, 14 pp. (English). CODEN: USXXAM. APPLICATION: US 1996-748009 19961112.

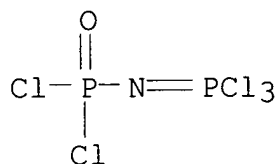
AB The **electrolyte** solns. contain an **electrolyte** solute and a sulfonyl/phospho compd. solvent RSO_2X (X = halide and R = perfluoroalkyl group, perchlorinated group, $N:PX_3$) or $X_3P:NR'$ [R' = $P(O)X_2$ or C1-6 alkyl group]. The solvent may contain Cl_3PNSO_2Cl , $Cl_3PNP(O)Cl_2$, Cl_3PNCH_3 , $Cl_3PNCH_2CH_3$, and/or $CF_3(CF_2)_3SO_2F$; and the **electrolyte** solute is $LiAlCl_4$ or $(CF_3SO_2)_2NLi$. The **electrolyte** may also contain a polymer.

IT 13966-08-0P 14700-21-1P 23453-30-7P
44584-14-7P

(high cond. **electrolyte** solns. contg. sulfur-phosphorus
compd. **electrolyte** solvents for secondary
batteries)

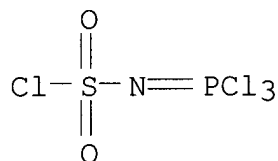
RN 13966-08-0 HCA

CN Phosphorimidic trichloride, (dichlorophosphinyl)- (6CI, 8CI, 9CI)
(CA INDEX NAME)



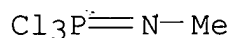
RN 14700-21-1 HCA

CN Sulfamoyl chloride, (trichlorophosphoranylidene)- (7CI, 8CI, 9CI)
(CA INDEX NAME)



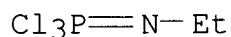
RN 23453-30-7 HCA

CN Phosphorimidic trichloride, methyl- (8CI, 9CI) (CA INDEX NAME)



RN 44584-14-7 HCA

CN Phosphorimidic trichloride, ethyl- (9CI) (CA INDEX NAME)



IC ICM H01M006-14

INCL 429194000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium **battery electrolyte** solvent;
battery electrolyte solvent sulfur phosphorous
compd

IT **Battery electrolytes**

(high cond. **electrolyte** solns. contg. sulfur-phosphorus
compd. **electrolyte** solvents for secondary lithium

batteries and sodium/sulfur **batteries**)

IT 124-63-0, Methanesulfonyl chloride 9011-14-7, Pmma 14024-11-4,
Aluminum lithium chloride (LiAlCl₄) 90076-65-6
(high cond. **electrolyte** solns. contg. sulfur-phosphorus
compd. **electrolyte** solvents for secondary
batteries)

IT 13966-08-0P 14700-21-1P 23453-30-7P
44584-14-7P

(high cond. **electrolyte** solns. contg. sulfur-phosphorus
compd. **electrolyte** solvents for secondary
batteries)

L43 ANSWER 7 OF 41 HCA COPYRIGHT 2005 ACS on STN

127:53456 Sulfonyl/phospho-compound solvent for high-conductivity

electrolyte solutions and secondary **batteries**

incorporating these solutions. Angell, Charles Austen; Zhang, Sheng
Shui; Xu, Kang (Arizona State University, Board of Regents, USA).

PCT Int. Appl. WO 9718595 A1 **19970522**, 21 pp. DESIGNATED

STATES: W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE,
DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR,
LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD,
SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, AM, AZ, BY, KG, KZ,
MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES,
FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD,
TG. (English). CODEN: PIXXD2. APPLICATION: WO 1996-US18324

19961113. PRIORITY: US 1995-6436 19951113.

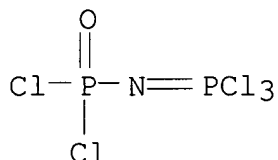
AB The solvent is selected from Cl₃PN₂SO₂Cl, Cl₃PNP(O)Cl₂, Cl₃PNCH₃, and
Cl₃PNCH₂CH₃. A sulfonyl/phospho-compd. **electrolyte** soln.
comprises an **electrolyte** solute and a sulfonyl/phospho-
compd. **electrolyte** solvent.

IT 13966-08-0P 14700-21-1P 23453-30-7P
44584-14-7P

(solvent for high-cond. **battery electrolyte**
solns.)

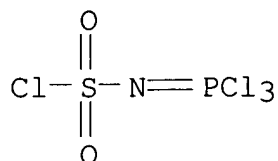
RN 13966-08-0 HCA

CN Phosphorimidic trichloride, (dichlorophosphinyl)- (6CI, 8CI, 9CI)
(CA INDEX NAME)

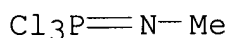


RN 14700-21-1 HCA

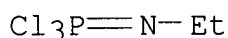
CN Sulfamoyl chloride, (trichlorophosphoranylidene)- (7CI, 8CI, 9CI)
(CA INDEX NAME)



RN 23453-30-7 HCA
 CN Phosphorimidic trichloride, methyl- (8CI, 9CI) (CA INDEX NAME)



RN 44584-14-7 HCA
 CN Phosphorimidic trichloride, ethyl- (9CI) (CA INDEX NAME)

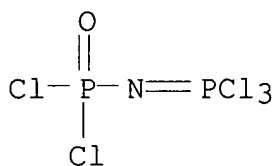


IC ICM H01M006-14
 ICS H01M006-16; H01M006-04
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49, 76
 ST **battery electrolyte** solvent sulfonyl phospho
 compd
 IT **Battery electrolytes**
 (sulfonyl/phospho-compd. solvent for high-cond.)
 IT 124-63-0, Methyl sulfonyl chloride
 (solvent for high-cond. **battery electrolyte**
 solns.)
 IT **13966-08-0P 14700-21-1P 23453-30-7P**
44584-14-7P
 (solvent for high-cond. **battery electrolyte**
 solns.)

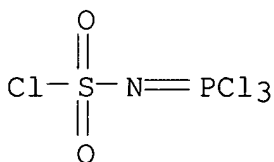
L43 ANSWER 8 OF 41 HCA COPYRIGHT 2005 ACS on STN
 127:53454 Electrochemically stable **electrolytes** which do not
 crystallize at ambient temperature. Angell, Charles Austen; Zhang,
 Sheng Shui; Xu, Kang (Arizona Board of Regents, USA). PCT Int.
 Appl. WO 9718159 A1 **19970522**, 31 pp. DESIGNATED STATES:
 W: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE,
 ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT,
 LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG,
 SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, AM, AZ, BY, KG, KZ, MD, RU,
 TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FI, FR,
 GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG.
 (English). CODEN: PIXXD2. APPLICATION: WO 1996-US18325 19961113.

PRIORITY: US 1995-6437 19951113; US 1996-748008 19961112.

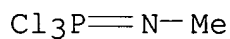
- AB The **electrolytes** are quasi-salt inorg. ionic liqs. which comprise the reaction product of a strong Lewis acid with an inorg. halide-donating mol., which comprises a substructure selected from NPX₃, SO₂X, and C(O)X, where X is a halogen. The strong Lewis acid is selected from AlCl₃, BCl₃, SbCl₃, and FeCl₃. These quasi-salt inorg. ionic liq. mixts. are useful **electrolytes**.
- IT **13966-08-0DP**, reaction product with aluminum chloride
14700-21-1DP, reaction product with aluminum chloride
23453-30-7DP, reaction product with aluminum chloride
44584-14-7DP, reaction product with boron chloride
 (electrochem. stable **electrolytes** from)
- RN 13966-08-0 HCA
- CN Phosphorimidic trichloride, (dichlorophosphinyl)- (6CI, 8CI, 9CI)
 (CA INDEX NAME)



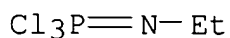
- RN 14700-21-1 HCA
- CN Sulfamoyl chloride, (trichlorophosphoranylidene)- (7CI, 8CI, 9CI)
 (CA INDEX NAME)



- RN 23453-30-7 HCA
- CN Phosphorimidic trichloride, methyl- (8CI, 9CI) (CA INDEX NAME)



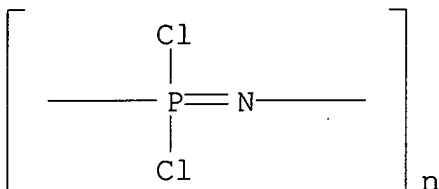
- RN 44584-14-7 HCA
- CN Phosphorimidic trichloride, ethyl- (9CI) (CA INDEX NAME)



- IC ICM C01B021-06
 ICS C01B025-10; C01C001-02; H01B001-00

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
- ST **battery electrolyte** electrochem stable; halide
donating mol Lewis acid **electrolyte**
- IT **Battery electrolytes**
(electrochem. stable which do not crystallize at ambient temp.)
- IT 7446-70-0D, Aluminum chloride (AlCl₃), reaction product with inorg.
halide-donating mol., processes 7705-08-0D, Iron chloride (FeCl₃),
reaction product with inorg. halide-donating mol., processes
10025-91-9D, Antimony chloride (SbCl₃), reaction product with inorg.
halide-donating mol. 10294-34-5D, Boron chloride (BCl₃), reaction
product with inorg. halide-donating mol.
(electrochem. stable **electrolytes** from)
- IT 75-36-5DP, Acetyl chloride, reaction product with aluminum chloride
13966-08-0DP, reaction product with aluminum chloride
14700-21-1DP, reaction product with aluminum chloride
23453-30-7DP, reaction product with aluminum chloride
44584-14-7DP, reaction product with boron chloride
(electrochem. stable **electrolytes** from)
- IT 2926-30-9, Sodium trifluoromethanesulfonate 7784-16-9, Sodium
chloroaluminate 14024-11-4, Lithium chloroaluminate 33454-82-9,
Lithium trifluoromethanesulfonate 90076-65-6, Lithium
bis(trifluoromethylsulfonyl)imide 91742-21-1, Sodium
bis(trifluoromethylsulfonyl)imide
(quasi-salt inorg. ionic liq. **electrolytes** contg.)
- L43 ANSWER 9 OF 41 HCA COPYRIGHT 2005 ACS on STN
- 127:51363 Polyphosphazene **Electrolytes**. 1. Preparation and
Conductivities of New Polymer **Electrolytes** Based on
Poly[bis(amino)phosphazene] and Lithium Perchlorate. Chen-Yang, Y.
W.; Hwang, J. J.; Chang, F. H. (Department of Chemistry, Chung Yuan
Christian University, Chung-Li, 32023, Taiwan). *Macromolecules*,
30(13), 3825-3831 (English) **1997**. CODEN: MAMOBX. ISSN:
0024-9297. Publisher: American Chemical Society.
- AB Two series of new phosphazene polymer **electrolytes**,
PPAP/LiClO₄ and PHAP/LiClO₄, were prepd. by complexing lithium
perchlorate, LiClO₄, to poly(bis(pentylamino)phosphazene), PPAP, and
poly(bis(hexylamino)phosphazene), PHAP, resp. The
electrolytes were characterized by the combination of FTIR,
31P-NMR, and 13C-NMR spectroscopies. Films of these
electrolytes showed good dimensional stability and ionic
cond. The glass transition temps. were detd. by differential
scanning calorimetry. The highest ionic cond., .sigma., was 7
orders higher in magnitude than the .sigma. of its parent polymer
and was similar to the .sigma. of PEO at room temp. The plots of
ionic cond. vs. temp. for the polymer **electrolytes** were
found to correspond to the Vogel-Tammann-Fulcher equation throughout
the temp. range 30-100 .degree.C.

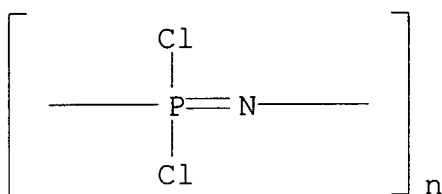
IT **26085-02-9DP**, Hexachlorocyclotriphosphazene homopolymer,
 sru, reaction products pentylamine or hexylamine
 (prepn. and conductivities of polymer **electrolytes**
 based on poly[bis(amino)phosphazene] and lithium perchlorate)
 RN 26085-02-9 HCA
 CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



CC 37-4 (Plastics Manufacture and Processing)
 Section cross-reference(s): 38, 76
 ST lithium polyalkylamino phosphazene solid **electrolyte** cond
 IT **Battery electrolytes**
 Glass transition temperature
 Ionic conductivity
 (prepn. and conductivities of polymer **electrolytes**
 based on poly[bis(amino)phosphazene] and lithium perchlorate)
 IT Polyphosphazenes
 (prepn. and conductivities of polymer **electrolytes**
 based on poly[bis(amino)phosphazene] and lithium perchlorate)
 IT 7439-93-2, Lithium, uses
 (prepn. and conductivities of polymer **electrolytes**
 based on poly[bis(amino)phosphazene] and lithium perchlorate)
 IT 110-58-7DP, Pentylamine, reaction products with
 poly(dichlorophosphazene) 111-26-2DP, Hexylamine, reaction
 products with poly(dichlorophosphazene) 25231-98-5DP,
 Hexachlorocyclotriphosphazene homopolymer, reaction products
 pentylamine or hexylamine **26085-02-9DP**,
 Hexachlorocyclotriphosphazene homopolymer, sru, reaction products
 pentylamine or hexylamine
 (prepn. and conductivities of polymer **electrolytes**
 based on poly[bis(amino)phosphazene] and lithium perchlorate)
 L43 ANSWER 10 OF 41 HCA COPYRIGHT 2005 ACS on STN
 127:37198 Secondary lithium **batteries** using polymer solid
electrolytes. Higashimoto, Koji; Hayakawa, Takumi; Komaki,
 Akio; Sasaoka, Michio; Nakanaga, Takefumi; Inubuse, Akiyoshi
 (Shin-Kobe Electric Machinery Co., Ltd., Japan; Otsuka Chemical Co.,
 Ltd.; Otsuka Chemical Holdings Co., Ltd.). Jpn. Kokai Tokkyo Koho
 JP 09092331 A2 **19970404** Heisei, 7 pp. (Japanese). CODEN:
 JKXXAF. APPLICATION: JP 1995-242787 19950921.
 AB In the **batteries** using C anodes, the **electrolytes**

comprise polymers having arom. hydrocarbon and/or heterocyclic arom. hydrocarbon groups. Since the adhesion between the **electrolytes** and the anodes is improved, Li⁺ is easily absorbed in the anodes to allow the **batteries** to have high capacity and long cycle life.

- IT **26085-02-9DP**, Hexachlorocyclotriphosphazene polymer, sru, reaction products with polyethylene oxide ether
(Li **batteries** using C anodes and arom. polymer solid **electrolytes** for capacity and cycle)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M010-40
ICS H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST lithium **battery** arom polymer solid **electrolyte**;
carbon anode lithium **battery** polymer **electrolyte**
; heterocyclic arom hydrocarbon polymer **electrolyte**
battery
- IT **Battery** anodes
Battery electrolytes
(Li **batteries** using C anodes and arom. polymer solid **electrolytes** for capacity and cycle)
- IT Polyphosphazenes
(Li **batteries** using C anodes and arom. polymer solid **electrolytes** for capacity and cycle)
- IT 7782-42-5, JSP, uses
(Li **batteries** using C anodes and arom. polymer solid **electrolytes** for capacity and cycle)
- IT 9004-74-4DP, Polyethylene glycol methyl ether, reaction products with phosphazene polymers 9004-78-8DP, reaction products with phosphazene polymers 25231-98-5DP, Hexachlorocyclotriphosphazene polymer, reaction products with polyethylene oxide ether **26085-02-9DP**, Hexachlorocyclotriphosphazene polymer, sru, reaction products with polyethylene oxide ether 34383-56-7DP, reaction products with phosphazene polymers 69778-08-1DP, phosphazene polymers 189638-25-3P 189638-28-6P 189638-29-7P
(Li **batteries** using C anodes and arom. polymer solid **electrolytes** for capacity and cycle)

L43 ANSWER 11 OF 41 HCA COPYRIGHT 2005 ACS on STN

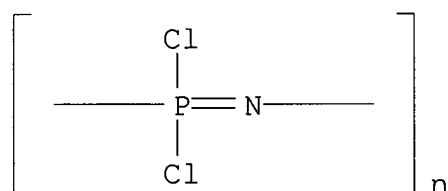
127:34925 Effect of Oligo(ethyleneoxy)cyclotriphosphazenes, Tetraglyme, and Other Small Molecules on the Ionic Conductivity of the Poly[bis(methoxyethoxyethoxy)phosphazene] (MEEP)/Lithium Triflate System. Allcock, Harry R.; Ravikiran, Ramakrishna; O'Connor, Stephen J. M. (Department of Chemistry, Pennsylvania State University, University Park, PA, 16802, USA). *Macromolecules*, 30(11), 3184-3190 (English) **1997**. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB Four small mol. cyclotriphosphazenes bearing linear and branched ethyleneoxy units have been synthesized as ion transport assistance (ITA) species to improve the ionic cond. of poly[bis(methoxyethoxyethoxy)phosphazene] (MEEP)-lithium triflate systems. The cyclotriphosphazenes were characterized by ^{31}P , ^1H , and ^{13}C NMR spectroscopy and IR spectroscopy. MEEP was complexed with lithium triflate and combined with different amts. of each of the ITA mols. Room temp. cond. measurements and differential scanning calorimetry expts. were carried out on each of these mixts. The effect of concn. of the ITA mols. and salt on the ionic cond. of MEEP is reported. The general trend obsd. is an increased cond. with increasing ITA mol. concn. The effect of branching in the ITA mol. on the ionic cond. was studied by comparing influence of branched vs linear side groups. Differential scanning calorimetry data indicate that these small mols. play a role in ionic crosslinking. The influence of high dielec. solvents on the ionic cond. of MEEP/ LiSO_3CF_3 systems was also studied. These solvents generated higher conductivities at the same concn. than did the cyclotriphosphazene ITA species.

IT **26085-02-9D**, Hexachlorocyclotriphosphazene homopolymer, sru, bis(methoxyethoxyethoxy)
(effect of oligo(ethyleneoxy)cyclotriphosphazenes, tetraglyme, and other small mols. on the ionic cond. of the poly[bis(methoxyethoxyethoxy)phosphazene] /Li triflate system)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



CC 37-6 (Plastics Manufacture and Processing)

Section cross-reference(s): 38, 72

ST oligoethyleneoxy cyclotriphosphazene ionic cond enhancement

polybismethoxyethoxyethoxyphosphazene; lithium triflate
polybismethoxyethoxyethoxyphosphazene oligoethyleneoxycyclotriphosphazene **electrolyte**

IT **Battery electrolytes**

Ionic conductivity

(effect of oligo(ethyleneoxy)cyclotriphosphazenes, tetraglyme, and other small mols. on the ionic cond. of the poly[bis(methoxyethoxyethoxy)phosphazene] /Li triflate system)

- IT 111-77-3D, reaction products with poly(dichlorophosphazenes)
7439-93-2, Lithium, properties 25231-98-5D,
Hexachlorocyclotriphosphazene homopolymer, bis(methoxyethoxyethoxy) **26085-02-9D**, Hexachlorocyclotriphosphazene homopolymer, sru, bis(methoxyethoxyethoxy)
(effect of oligo(ethyleneoxy)cyclotriphosphazenes, tetraglyme, and other small mols. on the ionic cond. of the poly[bis(methoxyethoxyethoxy)phosphazene] /Li triflate system)

L43 ANSWER 12 OF 41 HCA COPYRIGHT 2005 ACS on STN

126:149660 Room temperature inorganic "quasi-molten salts" as alkali-metal **electrolytes**. Xu, K.; Zhang, S.; Angell, C. A. (Dep. Chem., Arizona State Univ., Tempe, AZ, 85287-1604, USA). Journal of the Electrochemical Society, 143(11), 3548-3554 (English) **1996**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

- AB Room temp. inorg. liqs. of high ionic cond. were prep'd. by reacting Lewis acid AlCl_3 with sulfonyl chlorides. The mechanism is not clear at this time since a crystal structure study of the 1:1 complex with $\text{CH}_3\text{SO}_2\text{Cl}$ ($T_m = 30^\circ\text{C}$) is not consistent with a simple chloride transfer to create AlCl_4^- anions. The liq. is in a state somewhere between ionic and mol. A new term quasi-molten salt is adopted to describe this state. A comparably conducting liq. can be made using BCl_3 in place of AlCl_3 . Unlike their org. counterparts based on ammonium cations (e.g., pyridinium or imidazolium) which reduce in the presence of alkali metals, this inorg. class of cation shows great stability against electrochem. redn. (.apprx. -1.0 V vs. Li^+/Li), with the useful consequence that reversible lithium and sodium metal deposition/stripping can be supported. The electrochem. window for these quasi-salts with AlCl_3 ranges up to 5.0 V, and their room temp. conductivities exceed 10^{-4} S/cm. They dissolve lithium and sodium tetrachloroaluminates up to mole fraction .apprx. 0.6 at 100°C . and intermediate compns. are permanently stable at ambient. The resultant lithium or sodium salt solns. exhibit electrochem. windows of 4.5-5.0 V vs. Li^+/Li or Na^+/Na and show room temp. conductivities of 10^{-3} to $10^{-2.5}$ S/cm. In preliminary charge/discharge tests, the cell $\text{Li}/\text{quasi-ionic liq. electrolyte}/\text{Li}_1\text{xMn}_2\text{O}_4$ showed a discharge capacity of .apprx. 110 mA-h/(g of cathode) and sustained 80% of the initial capacity after 60 cycles, indicating that these

quasi-molten salt-based **electrolytes** are promising candidates for alkali-metal **batteries**.

IT **186696-36-6P**

(electrochem. potential window and room temp. inorg. quasi-molten salts as alkali-metal **electrolytes**)

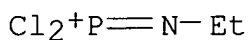
RN 186696-36-6 HCA

CN Phosphorus(1+), dichloro[ethanaminato(2-)]-, tetrachloroborate(1-)
(9CI) (CA INDEX NAME)

CM 1

CRN 186696-35-5

CMF C2 H5 Cl2 N P

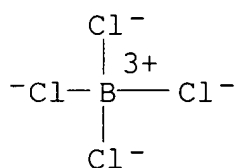


CM 2

CRN 14911-67-2

CMF B Cl4

CCI CCS



IT **186696-38-8P 186696-40-2P 186696-43-5P**

(ionic cond. and electrochem. potential window and room temp. inorg. quasi-molten salts as alkali-metal **electrolytes**)

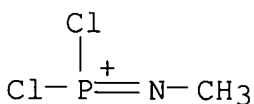
RN 186696-38-8 HCA

CN Phosphorus(1+), dichloro[methanaminato(2-)]-, (T-4)-tetrachloroaluminate(1-) (9CI) (CA INDEX NAME)

CM 1

CRN 186696-37-7

CMF C H3 Cl2 N P

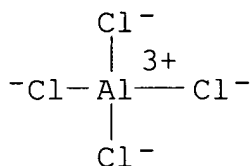


CM 2

CRN 17611-22-2

CMF Al Cl4

CCI CCS



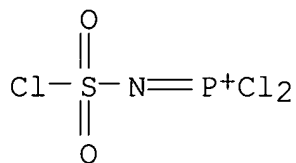
RN 186696-40-2 HCA

CN Phosphorus(1+), dichloro[sulfamoyl chloridato(2-)-.kappa.N]-,
(T-4)-tetrachloroaluminate(1-) (9CI) (CA INDEX NAME)

CM 1

CRN 186696-39-9

CMF Cl3 N O2 P S

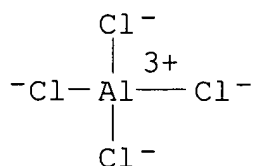


CM 2

CRN 17611-22-2

CMF Al Cl4

CCI CCS



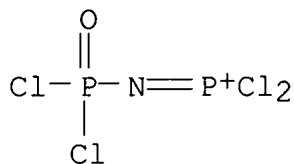
RN 186696-43-5 HCA

CN Phosphorus(1+), dichloro[phosphoramidic dichloridato(2-)-.kappa.N]-,
(T-4)-tetrachloroaluminate(1-) (9CI) (CA INDEX NAME)

CM 1

CRN 186696-42-4

CMF Cl4 N O P2

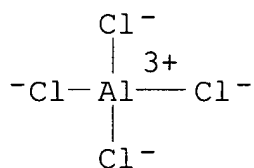


CM 2

CRN 17611-22-2

CMF Al Cl4

CCI CCS

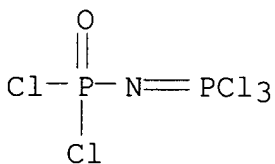
IT **13966-08-0P 14700-21-1P,**

Trichlorophosphazosulfonyl chloride

(reaction with aluminum chloride: electrochem. potential window
and room temp. inorg. quasi-molten salts as alkali-metal
electrolytes)

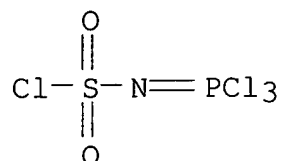
RN 13966-08-0 HCA

CN Phosphorimidic trichloride, (dichlorophosphinyl)- (6CI, 8CI, 9CI)
(CA INDEX NAME)



RN 14700-21-1 HCA

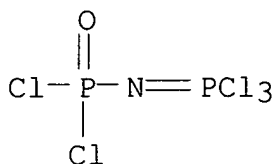
CN Sulfamoyl chloride, (trichlorophosphoranylidene)- (7CI, 8CI, 9CI)
(CA INDEX NAME)



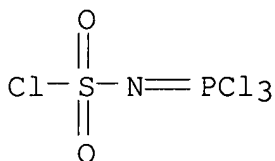
- CC 72-2 (Electrochemistry)
Section cross-reference(s): 52, 68, 76
- ST room temp inorg quasi molten salt; alkali metal **electrolyte**
quasi molten salt; sulfonyl aluminum chloride melt electrochem
window; phosphoryl aluminum chloride melt electrochem window;
electrochem potential window sulfonyl phosphoryl chloroaluminate;
battery electrolyte inorg quasi molten salt
- IT **Battery electrolytes**
(of sulfonyl chloride or phosphoryl chloride compds. with
aluminum chloride)
- IT **186696-36-6P**
(electrochem. potential window and room temp. inorg. quasi-molten
salts as alkali-metal **electrolytes**)
- IT **186696-38-8P 186696-40-2P 186696-41-3P**
186696-43-5P
(ionic cond. and electrochem. potential window and room temp.
inorg. quasi-molten salts as alkali-metal **electrolytes**)
- IT 75-36-5, Acetyl chloride 124-63-0, Methanesulfonyl chloride
(reaction with aluminum chloride: electrochem. potential window
and room temp. inorg. quasi-molten salts as alkali-metal
electrolytes)
- IT 6041-61-8P **13966-08-0P 14700-21-1P**,
Trichlorophosphazosulfonyl chloride
(reaction with aluminum chloride: electrochem. potential window
and room temp. inorg. quasi-molten salts as alkali-metal
electrolytes)
- L43 ANSWER 13 OF 41 HCA COPYRIGHT 2005 ACS on STN
125:252809 Inorganic **electrolyte** solutions and gels for
rechargeable lithium **batteries**. Xu, Kang; Day, Natalie
D.; Angell, C. Austen (Dep. Chem., Arizona State Univ., Tempe, AZ,
85287-1604, USA). Journal of the Electrochemical Society, 143(9),
L209-L211 (English) **1996**. CODEN: JESOAN. ISSN:
0013-4651. Publisher: Electrochemical Society.
- AB A class of inorg. oxychloride compds. have been evaluated for use as
electrolytic solvents in rechargeable lithium
batteries. Compared with SO₂-based **electrolytes**,
these showed much improved safety while maintaining room temp.
conductivities of 10⁻³-10⁻² S/cm and electrochem. voltage windows of
4.5-5.5 V vs. Li⁺/Li and supporting reversible Li metal

deposition/stripping. With the addn. of 2-5% polymer, the solns. acquire rubbery character with little loss of cond. and no change in electrochem. stability. Preliminary charge/discharge tests with intercalation-type cathode as well as sulfur-based cathode showed that these inorg. **electrolytes** can operate with excellent reversibility.

- IT **13966-08-0 14700-21-1**, Trichlorophosphazosulfonyl chloride
 (solvent; inorg. **electrolyte** solns. and gels for rechargeable lithium **batteries**)
 RN 13966-08-0 HCA
 CN Phosphorimidic trichloride, (dichlorophosphinyl)- (6CI, 8CI, 9CI)
 (CA INDEX NAME)



- RN 14700-21-1 HCA
 CN Sulfamoyl chloride, (trichlorophosphoranylidene)- (7CI, 8CI, 9CI)
 (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST lithium **battery** inorg **electrolyte** soln gel;
 safety lithium **battery** inorg **electrolyte** oxychloride
 IT **Battery electrolytes**
 (inorg. **electrolyte** solns. and gels for rechargeable lithium **batteries**)
 IT Electric conductivity and conduction
 (ionic, inorg. **electrolyte** solns. and gels for rechargeable lithium **batteries**)
 IT 9011-14-7, Pmma
 (**electrolyte** additive; inorg. **electrolyte** solns. and gels for rechargeable lithium **batteries**)
 IT 14024-11-4, Lithium tetrachloroaluminate 90076-65-6
 (**electrolyte**; inorg. **electrolyte** solns. and gels for rechargeable lithium **batteries**)

IT 124-63-0, Methane sulfonylchloride **13966-08-0**
14700-21-1, Trichlorophosphazosulfonyl chloride
 (solvent; inorg. **electrolyte** solns. and gels for
 rechargeable lithium **batteries**)

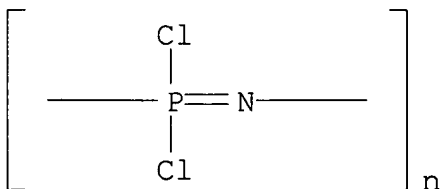
L43 ANSWER 14 OF 41 HCA COPYRIGHT 2005 ACS on STN
 125:206802 Solid-state lithium cells based on fluorinated fullerene
 cathodes. Liu, Ning; Touhara, Hidekazu; Okino, Fujio; Kawasaki,
 Shinji; Nakacho, Yoshifumi (Faculty Textile Science Technology,
 Shinshu University, Ueda, 386, Japan). Journal of the
 Electrochemical Society, 143(7), 2267-2272 (English) **1996**.
 CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical
 Society.

AB The electrochem. characteristics of fullerenes and fluorinated
 fullerenes were studied by cyclic voltammetry and galvanostatic
 discharge using solid-state lithium cells Li/Li⁺-(MEP-7)/A (A = C₆₀,
 C₇₀, C₆₀F_x, and C₇₀F_x, MEP-7 = a polyphosphazene deriv.). In the
 cyclic voltammograms of C₆₀ and C₇₀, the 1st half-wave potential of
 C₇₀ is 0.2 V more pos. than that of C₆₀, suggesting that the
 electron affinity of C₇₀ is slightly larger than that of C₆₀. For
 the fluorinated fullerenes, cyclic voltammetry gives one
 irreversible redn. peak at a high potential, which was verified to
 be due to the redn. of the C-F bonds by XPS. From the discharge
 curves of C₆₀F_x and C₇₀F_x, a high utility of 90% was obtained.
 Changes in electronic structure of the cathode materials upon
 discharge were examd. by XPS and open-circuit voltage dependence on
 cathode utilities, and the discharge reaction mechanism is deduced.
 The open-circuit voltage dependence reveals that the electronic
 structure of fluorinated fullerenes changes continuously as a
 homogeneous electrochem. redn. proceeds.

IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)],
 methoxyethyl ethers
 (MEP 7; electroredn. of fullerene and fluorinated fullerenes in
 lithium cell with polyphosphazene deriv. **electrolyte**:
 solid-state lithium cells based on fluorinated fullerene
 cathodes)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



(MEP 7; of fullerene and fluorinated fullerenes in lithium cell

- with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes
- CC 72-2 (Electrochemistry)
Section cross-reference(s): 52, 78
- ST fullerene electroredn polyphosphazene **electrolyte** lithium **cell**; fluorinated fullerene electroredn polyphosphazene lithium cell; cathode **battery** fluorinated fullerene
- IT Reduction, electrochemical
(of fullerene and fluorinated fullerenes in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT Cathodes
(**battery**, fluorinated fullerenes)
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)], methoxyethyl ethers
(MEP 7; electroredn. of fullerene and fluorinated fullerenes in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)], methoxyethyl ethers, lithium complex
(MEP 7; of fullerene and fluorinated fullerenes in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT 133318-63-5, Fullerene-C60 ion(3-) 133320-11-3, Fullerene-C70 ion(3-)
(elec. potential in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT 111138-12-6, Fullerene-C60 ion(1-) 120329-58-0, Fullerene-C60 ion(2-) 133227-82-4, Fullerene-C70 ion(1-) 133320-10-2, Fullerene-C70 ion(2-)
(elec. potential in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT 99685-96-8, C60 Fullerene 115383-22-7, C70 Fullerene
(electrochem. redn. in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT 143471-96-9 145617-55-6 150180-35-1 152273-04-6 167229-22-3
172760-25-7 172807-55-5 181240-13-1 181240-15-3 181240-17-5
181240-19-7
(electroredn. in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT 7439-93-2, Lithium, uses
(electroredn. of fullerene and fluorinated fullerenes in lithium cell with polyphosphazene deriv. **electrolyte**:

solid-state lithium cells based on fluorinated fullerene cathodes)

- IT 7791-03-9, Lithium perchlorate
(of fullerene and fluorinated fullerenes in lithium cell with polyphosphazene deriv. **electrolyte** with lithium perchlorate: solid-state lithium cells based on fluorinated fullerene cathodes)
- IT 7439-93-2D, Lithium, polyphosphazene deriv. complex
(of fullerene and fluorinated fullerenes in lithium cell with polyphosphazene deriv. **electrolyte**: solid-state lithium cells based on fluorinated fullerene cathodes)

L43 ANSWER 15 OF 41 HCA COPYRIGHT 2005 ACS on STN

125:119530 Ion-conductive polymers for electrochemical devices.

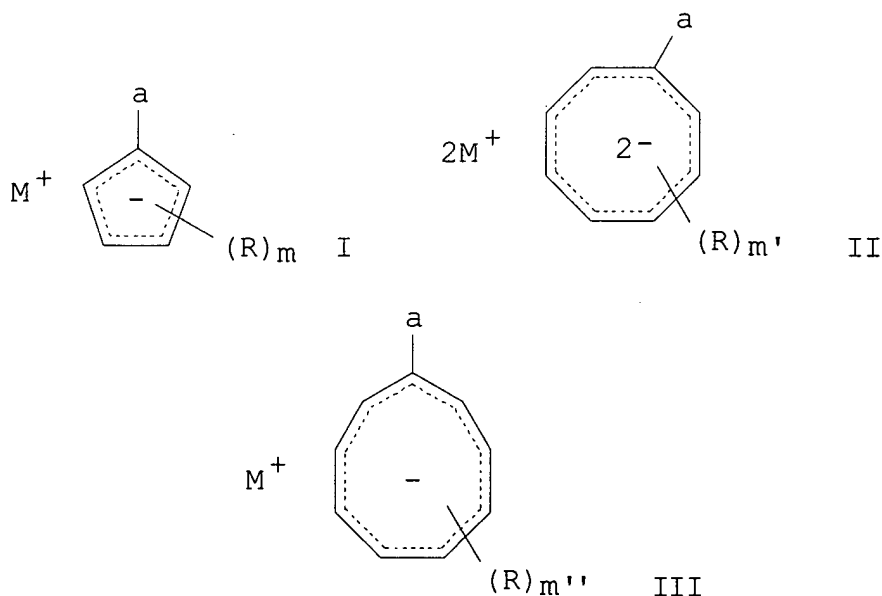
Rosenmeier, Lars; Knutz, Boye Cornils (Danacell Aps, Den.). PCT Int. Appl. WO 9617359 A1 **19960606**, 42 pp. DESIGNATED

STATES: W: AL, AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, CZ, DE, DE, DK, DK, EE, EE, ES, FI, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG.

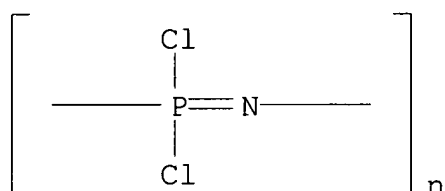
(English). CODEN: PIXXD2. APPLICATION: WO 1995-DK484 19951130.

PRIORITY: DK 1994-1370 19941201.

GI



- AB An ion-conductive polymer, suited for use as an **electrolyte** in electrochem. devices, e.g., rechargeable **batteries**, fuel cells, contg. covalently bound ion complexes of one of formulas I, II, or III (M^+ is H^+ , Li^+ , Na^+ , or K^+ ; m is an integer in the range 0-4; m' is an integer in the range 0-7; m'' is an integer in the range 0-8; and each R independently is halogen; $-CO-O-, M^+$, or $-SO_2-O-, M^+$; cyano; nitro; C1-5 alkoxy; optionally substituted Ph or phenoxy; $-CONR_5R_6$ or $-NR_5R_6$ where R_5 and R_6 independently are hydrogen, C1-5 alkyl, optionally substituted Ph, phenylcarbonyl, or C1-6 alkanoyl; $-N(R_5)-CO-R_7$ where R_7 is hydrogen, C1-5 alkyl, C2-5 alkenyl, C2-5 alkynyl, or optionally substituted phenyl; R_7-CO- , $R_7-O-CO-$, $R_7-CO-O-$, or $R_7-O-CO-O-$; cycloheptatrienyl; or a group further specified).
- IT **26085-02-9D**, Poly(dichlorophosphazene), reaction products with polyethoxylated compds. and lithium cyclopentadienylide derivs. (ion-conductive polymers as **electrolyte** for electrochem. devices)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01B001-12
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76
- ST ion conductor polymer **electrolyte electrochem cell**
- IT Electric conductors, polymeric
(ion; ion-conductive polymers as **electrolyte** for electrochem. devices)
- IT Electric apparatus
(electrochem., ion-conductive polymers as **electrolyte** for electrochem. devices)
- IT 9004-74-4D, reaction products with ethoxylated polysiloxanes
26085-02-9D, Poly(dichlorophosphazene), reaction products with polyethoxylated compds. and lithium cyclopentadienylide derivs.
132408-80-1D, reaction products with ethoxylated polysiloxanes
179074-70-5D, reaction products with ethoxylated polysiloxanes
179074-71-6D, reaction products with ethoxylated polysiloxanes
179074-72-7D, reaction products with ethoxylated polysiloxanes
179074-73-8D, reaction products with ethoxylated polysiloxanes

179074-74-9D, reaction products with ethoxylated polysiloxanes
 179074-75-0D, reaction products with ethoxylated polysiloxanes
 179074-76-1 179074-77-2 179074-79-4 179077-50-0
 203399-77-3D, reaction products with lithium cyclopentadienylide complexes

(ion-conductive polymers as **electrolyte** for electrochem. devices)

L43 ANSWER 16 OF 41 HCA COPYRIGHT 2005 ACS on STN

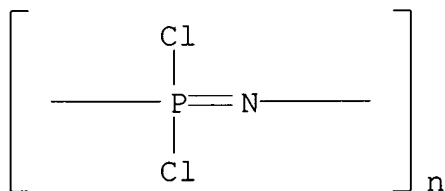
124:262166 Synthesis of Polyphosphazenes with Ethyleneoxy-Containing Side Groups: New Solid **Electrolyte** Materials. Allcock, Harry R.; Kuharcik, Susan E.; Reed, Carey S.; Napierala, Mark E. (Department of Chemistry, Pennsylvania State University, University Park, PA, 16802, USA). *Macromolecules*, 29(10), 3384-9 (English) **1996**. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB A series of mixed-substituent poly(organophosphazenes) with ethyleneoxy side groups was synthesized. These polymers possess multiple electron-donor coordination sites that can form complexes with metal salts which show solid **electrolyte** behavior. The polymers were characterized by ^{31}P , ^1H , and ^{13}C NMR spectroscopy, gel permeation chromatog. (GPC), differential scanning calorimetry (DSC), and elemental anal. All the mixed-substituent polymers have low glass transition temp., from -70 to -56 .degree., and at least one melting transition. Several polymer-lithium triflate complexes were examd. by impedance anal. The max. cond. for these polymers was 1.6×10^{-6} to 3.9×10^{-5} S/cm.

IT **26085-02-9DP**, Poly(dichlorophosphazene), reaction products with methoxy-ethoxy alcs. and alc. salts, lithium complexes (prepn. and Tg of ethyleneoxy-polyphosphazenes and elec. cond. of polymer-salt complexes for solid **electrolytes**)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



CC 36-5 (Physical Properties of Synthetic High Polymers)

Section cross-reference(s): 35, 76

ST polyphosphazene ethyleneoxy side group coordination salt; lithium triflate polyphosphazene solid **electrolyte** cond

IT **Battery electrolytes**

Electric conductivity and conduction

Glass temperature and transition

(prepn. and Tg of ethyleneoxy-polyphosphazenes and elec. cond. of polymer-salt complexes for solid **electrolytes**)

IT Phosphazene polymers

(alkoxy, prepn. and Tg of ethyleneoxy-polyphosphazenes and elec. cond. of polymer-salt complexes for solid **electrolytes**)

IT 5274-68-0DP, Poly(oxyethylene(4)) lauryl ether, reaction products with partially substituted lauryl ethyleneoxy polydichlorophosphazenes, lithium complexes 7439-93-2DP, Lithium, poly(ethyleneoxy-polyphosphazene) complexes 9004-74-4DP, Poly(ethylene glycol) methyl ether, reaction products with partially substituted lauryl ethyleneoxy polydichlorophosphazenes, lithium complexes 19278-10-5DP, Sodium 2-(2-methoxyethoxy)ethoxide, reaction products with partially substituted lauryl ethyleneoxy polydichlorophosphazenes, lithium complexes 25231-98-5DP, Hexachlorocyclotriphosphazene homopolymer, reaction products with methoxy-ethoxy alcs. and alc. salts, lithium complexes 25322-68-3DP, Polyethylene glycol, methoxy- and ethoxylauryloxy-terminated, reaction products with partially substituted lauryl ethyleneoxy polydichlorophosphazenes, lithium complexes **26085-02-9DP**, Poly(dichlorophosphazene), reaction products with methoxy-ethoxy alcs. and alc. salts, lithium complexes 33454-82-9DP, Lithium triflate, poly(ethyleneoxy-polyphosphazene) complexes

(prepn. and Tg of ethyleneoxy-polyphosphazenes and elec. cond. of polymer-salt complexes for solid **electrolytes**)

IT 111-77-3, 2-(2-Methoxyethoxy)ethanol 7646-69-7, Sodium hydride (prepn. and Tg of ethyleneoxy-polyphosphazenes and elec. cond. of polymer-salt complexes for solid **electrolytes**)

L43 ANSWER 17 OF 41 HCA COPYRIGHT 2005 ACS on STN

124:147481 Synthesis and Characterization of Ionically Conducting Alkoxy Ether/Alkoxy Mixed-Substituent Poly(organophosphazenes) and Their Use as Solid Solvents for Ionic Conduction. Allcock, Harry R.; Napierala, Mark E.; Cameron, Charles G.; O'Connor, Stephen J. M. (Department of Chemistry, Pennsylvania State University, University Park, PA, 16802, USA). Macromolecules, 29(6), 1951-6 (English) **1996**. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB A series of mixed-substituent poly(organophosphazenes) with the general structure $\{NP[OCH_2CH_2OCH_2CH_2OCH_3]_x[O(CH_2)_yCH_3]_{2-x}\}_n$, where $x = 1$ and $y = 2-9$ was synthesized. These polymers are candidates for use as solid polymeric, ionic conduction media. The polymers were characterized by 1H , ^{13}C , and ^{31}P NMR spectroscopy, gel permeation chromatog., elemental microanal., IR spectroscopy, and differential scanning calorimetry. The polymers were complexed with $LiSO_3CF_3$ and ambient temp. (25 .degree.C) ionic cond. studies were performed with the use of complex impedance anal. The effect of changes in the

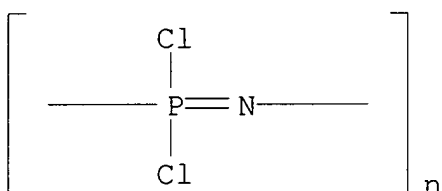
length of the alkyl component of the alkoxy groups on cond. was examd. A max. cond. as a function of the concn. of lithium triflate was found for each system. The cond. decreased with an increase in the alkyl group side-chain length. These polymers were compared to the polyphosphazene single-substituent polymer $[\text{NP}(\text{OCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OCH}_3)_2]_n$, as well as to the n-alkyloxy single-substituent polymers $\{\text{NP}[\text{O}(\text{CH}_2)_x\text{CH}_3]_2\}_n$, where $x = 2-9$.

IT **26085-02-9DP**, Poly(dichlorophosphazene), reaction products with sodium (methoxyethoxy)ethoxide and sodium alcoholate, lithium complexes

(prepn. of poly(organophosphazenes) with mixed alkoxy ether/alkoxy substituents as potential solid solvents for ionic conduction)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 36, 76

ST alkoxy methoxyethoxyethoxy polyphosphazene lithium complex prepn; ionic cond organopolyphosphazene lithium complex; solid **electrolyte** alkoxy methoxyethoxyethoxy polyphosphazene lithium

IT **Battery electrolytes**

(prepn. of poly(organophosphazenes) with mixed alkoxy ether/alkoxy substituents as potential solid solvents for ionic conduction)

IT 1941-84-0DP, 1-Pentanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 2372-45-4DP, 1-Butanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 6819-41-6DP, 1-Propanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 13675-38-2DP, 1-Decanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 17158-60-0DP, 1-Octanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 19278-10-5DP, Sodium 2-(2-methoxyethoxy)ethoxide, reaction products with

poly(dichlorophosphazene) and sodium alcoholates, lithium complexes 19779-06-7DP, 1-Hexanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 25231-98-5DP, Hexachlorocyclotriphosphazene homopolymer, reaction products with sodium (methoxyethoxy)ethoxide and sodium alcoholate, lithium complexes **26085-02-9DP**, Poly(dichlorophosphazene), reaction products with sodium (methoxyethoxy)ethoxide and sodium alcoholate, lithium complexes 38372-82-6DP, 1-Heptanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes 41924-50-9DP, 1-Nonanol, sodium salt, reaction products with partially (methoxyethoxy)ethoxy-substituted poly(dichlorophosphazene), lithium complexes (prepn. of poly(organophosphazenes) with mixed alkoxy ether/alkoxy substituents as potential solid solvents for ionic conduction)

L43 ANSWER 18 OF 41 HCA COPYRIGHT 2005 ACS on STN

123:61305 Crosslinking of solid state **battery**

electrolytes by ultraviolet radiation. Allcock, Harry R.; Nelson, Constance J.; Coggio, William D. (The Penn State Research Foundation, USA). U.S. US 5414025 A **19950509**, 4 pp. (English). CODEN: USXXAM. APPLICATION: US 1992-954444 19920930.

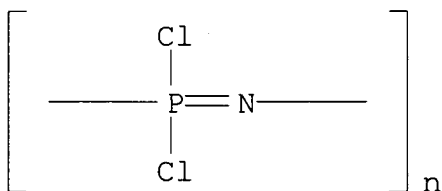
AB A crosslinkable material of essentially polyorganophosphazene contg. an alkyl C-H bond is exposed to a sufficient amt. of UV radiation to induce crosslinking of the polyorganophosphazene. The exposure takes place in the presence of the benzophenone photoinitiator.

IT **26085-02-9D**, Poly(dichlorophosphazene), reaction product with sodium 2-(2-methoxyethoxy)ethoxide

(in prepn. of UV radiation-crosslinked **battery electrolytes**)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



IC ICM C08G073-06

ICS C08G079-02

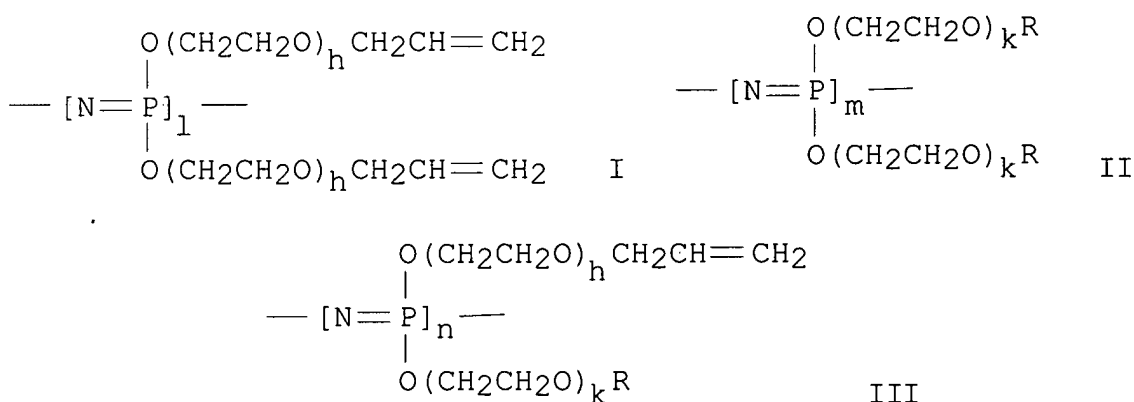
INCL 522046000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 37, 74

- ST crosslinking solid state **battery electrolyte**;
polyorganophosphazene crosslinking **battery electrolyte**; benzophenone photoinitiator
polyorganophosphazene crosslinking
- IT **Battery electrolytes**
(crosslinking by UV radiation)
- IT 98973-15-0P, Poly[bis[2-(2-methoxyethoxy)ethoxy]phosphazene]
(**battery electrolyte** prepd. by UV radiation crosslinking)
- IT 19278-10-5D, Sodium 2-(2-methoxyethoxy)ethoxide, reaction product with poly(dichlorophosphazene) **26085-02-9D**, Poly(dichlorophosphazene), reaction product with sodium 2-(2-methoxyethoxy)ethoxide
(in prepn. of UV radiation-crosslinked **battery electrolytes**)
- IT 119-61-9, Benzophenone, uses
(photoinitiator; in crosslinking of solid state **battery electrolytes** by UV radiation)

L43 ANSWER 19 OF 41 HCA COPYRIGHT 2005 ACS on STN
123:13713 Solid **electrolyte** having high ion conductivity for **batteries** and electrochromic displays. Tada, Juji; Nakanaga, Takefumi; Kameshima, Takashi; Inubushi, Akyoshi (Otsuka Kagaku Kk, Japan). Jpn. Kokai Tokkyo Koho JP 06236770 A2 **19940823** Heisei, 9 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1993-46004 19930210.

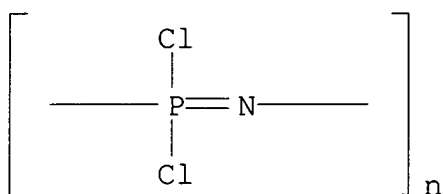
GI



- AB The **electrolyte** is prepd. by crosslinking a compn. contg. an **electrolyte** salt, a solvent, and an allyl group-contg., oligoethylene oxypolyphosphazene consisting of segments I, II, and III (where, R is Me, Et, and/or Pr; h and k are av. repeating no.

for ethylene oxy-units with h .ltoreq.15 and k .ltoreq.15; l + m + n = 3-200,000) arranged in an arbitrary order. Cations in the **electrolyte** salt are Li+, Na+, K+, Cs+, and Ag+, and anions are BF4-, AlCl4-, PF6-, AsF6-, ClO4-, CF3SO3-, Cl-, Br-, I-, and SCN-.

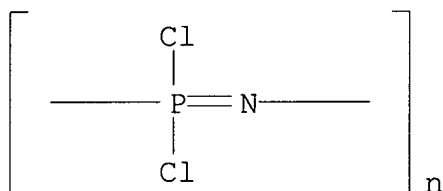
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with polyethylene glycol Me or allyl ethers (grafted; solid **electrolytes** having high ion cond. for **batteries** and electrochromic displays)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M010-40
ICS H01B001-06
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 74
- ST solid **electrolyte battery** ion cond;
electrochromic display solid **electrolyte**; phosphazene
polymer **electrolyte** secondary **battery**
- IT Phosphazene polymers
(allyl group-contg., oligoethylene oxy-; solid
electrolytes having high ion cond. for **batteries**
and electrochromic displays)
- IT **Battery electrolytes**
(solid **electrolytes** having high ion cond. for
batteries and electrochromic displays)
- IT Optical imaging devices
(electrochromic, solid **electrolytes** having high ion
cond. for **batteries** and electrochromic displays)
- IT 25231-98-5D, reaction products with polyethylene glycol Me or allyl
ethers **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne
)], reaction products with polyethylene glycol Me or allyl ethers
(grafted; solid **electrolytes** having high ion cond. for
batteries and electrochromic displays)
- L43 ANSWER 20 OF 41 HCA COPYRIGHT 2005 ACS on STN
- 123:10285 Manufacture and uses of electrically conductive cyclic
carbonate group-containing oligo(ethylene oxy)polyphosphazenes.
Tada, Juji; Kameshima, Takashi; Nakanaga, Takefumi (Otsuka Kagaku
Kk, Japan). Jpn. Kokai Tokkyo Koho JP 07026022 A2 **19950127**

Heisei, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1993-194071 19930708.

- AB The title compds. having repeating units $[N=P(X)(Y)]$ $[X, Y = O(CH_2CH_2O)_mCH_2CH(OC=OO)CH_2$ and $O(CH_2CH_2O)_nR$ ($R = Me, Et, Pr, allyl; m, n = 0-15$)] and useful for solid primary and secondary **batteries**, solid electrochromic displays, sensors, capacitors, etc. (no data) are manufd. by transforming a polyphosphonitrile chloride into P-alkoxylated derivs. using the corresponding (poly)alkoxylate metal salts. Thus, heating hexachlorocyclotriphosphonitrile at 250.degree. for 8 h gave a dichlorophosphonitrile polymer which was then dissolved in dioxane, combined with an alcoholate soln. contg. 0.35 mol ethylene glycol mono(2,2-dimethyl-1,3-dioxan-4-ylmethyl) ether, 0.35 mol methoxyethanol, and 0.60 mol n-BuLi in 500 mL THF at 10.degree. and heated at reflux to give a title polymer after working up.
- IT **26085-02-9DP**, Poly(dichlorophosphazene), reaction products with cyclic carbonate group-contg. alkoxylating agents and other alkoxylating agents
(manuf. and uses of elec. conductive cyclic carbonate group-contg. oligo(ethylene oxy)polyphosphazenes)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM C08G079-02
- CC 35-7 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 72
- ST polyphosphonitrile alkoxylate elec conductor; polyphosphazene alkoxylate elec conductor; electrochromic display alkoxylate polyphosphazene; capacitor alkoxylate polyphosphazene elec conductor; **battery** alkoxylate polyphosphazene solid conductor
- IT Electric conductors
Electrolytes
(manuf. and uses of elec. conductive cyclic carbonate group-contg. oligo(ethylene oxy)polyphosphazenes)
- IT 109-86-4DP, Methoxyethanol, reaction products with polyphosphazenes
9004-74-4DP, reaction products with polyphosphazenes
26085-02-9DP, Poly(dichlorophosphazene), reaction products with cyclic carbonate group-contg. alkoxylating agents and other alkoxylating agents 27274-31-3DP, reaction products with

polyphosphazenes 163883-78-1DP, reaction products with
 polyphosphazenes 163883-79-2DP, reaction products with
 polyphosphazenes
 (manuf. and uses of elec. conductive cyclic carbonate
 group-contg. oligo(ethylene oxy)polyphosphazenes)

L43 ANSWER 21 OF 41 HCA COPYRIGHT 2005 ACS on STN

120:249287 Solid polymer **electrolyte batteries**.

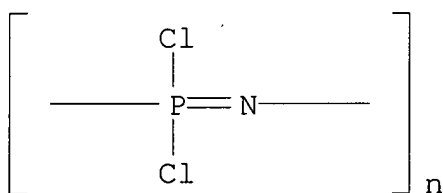
Higashimoto, Koji; Nakai, Kenji; Hironaka, Kensuke; Komaki, Akio;
 Nakanaga, Takefumi; Taniguchi, Masatoshi (Shin Kobe Electric
 Machinery, Japan; Otsuka Kagaku Kk). Jpn. Kokai Tokkyo Koho JP
 06013087 A2 **19940121** Heisei, 5 pp. (Japanese). CODEN:
 JKXXAF. APPLICATION: JP 1992-170465 19920629.

AB The **batteries** have a laminate of a cathode and an anode
 holding a polymer **electrolyte** in between, where the
 polymer has .gtoreq.1 peak in a low mol. wt. region and .gtoreq.
 peak in a high mol wt. region on the mol. distribution curve of the
 polymer. The wt. av. mol. wt. is preferably 1000-100,000 and
 1,000,000-10,000,000 for the low and high mol wt. regions, resp.
 The cathode of the **batteries** may contain a cathode active
 mass, the polymer **electrolyte**, and a conductive powder.

IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)],
 change graft copolymers with polyoxyethylene monomethyl ether,
 lithium complexes
 (**electrolyte**, mol. wt. distribution of, for lithium
batteries)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-18

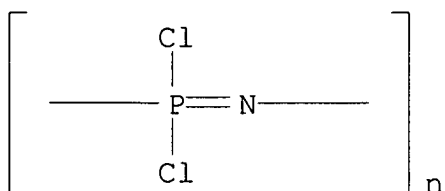
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

ST **battery** polymer solid **electrolyte**; mol wt
 distribution polymer **electrolyte**

IT **Battery electrolytes**
 (polyphosphazane-lithium salt, mol. wt. distribution of, for
battery capacity)

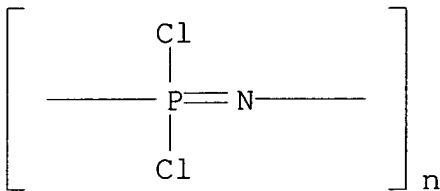
IT Phosphazene polymers
 (polyoxyalkylene-, graft, lithium complexes, **electrolyte**
 , mol. wt. distribution of, for lithium **batteries**)

- IT Polyoxyalkylenes, miscellaneous
(polyphosphazene-, graft, lithium complexes, **electrolyte**
, mol. wt. distribution of, for lithium **batteries**)
- IT 1314-62-1, Vanadium pentoxide, miscellaneous
(cathodes, solid polymer **electrolytes** in, for
batteries)
- IT 7439-93-2D, Lithium, complexes with polyoxyethylene monomethyl
ether-polyphosphazene copolymers 9004-74-4D, Polyethylene glycol
monomethyl ether, graft copolymers with dichlorophosphazene, lithium
complexes **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylid
yne)], change graft copolymers with polyoxyethylene monomethyl ether,
lithium complexes
(**electrolyte**, mol. wt. distribution of, for lithium
batteries)
- IT 7791-03-9, Lithium perchlorate
(**electrolytes** contg. polyoxyethylene monomethyl
ether-polyphosphazene graft copolymers and, mol. wt. distribution
of, for **batteries**)
- L43 ANSWER 22 OF 41 HCA COPYRIGHT 2005 ACS on STN
120:108625 Solid polymeric **electrolytes** based on crosslinked
MEEP-type materials. Allcock, H. R.; Nelson, C. J.; Coggio, W. D.
(Dep. Chem., Pennsylvania State Univ., University Park, PA, 16802,
USA). Polymeric Materials Science and Engineering, 68, 76-7
(English) **1993**. CODEN: PMSEDG. ISSN: 0743-0515.
- AB Li triflate-[-N=P(OCH₂CH₂OCH₂CH₂OCH₃)₂-]_n (MEEP) solid
electrolyte films can be readily crosslinked with 2200-4000
.ANG. UV light to inhibit slow extrusion of the **electrolyte**
from **electrolytic cells**.
- IT **26085-02-9D**, Poly(dichlorophosphazene), reaction products
with (methoxyethoxy)ethoxysodium, lithium complexes
(**electrolytes**, contg. trifluoromethanesulfonate, UV
crosslinking of solid, to inhibit extrusion from **battery**
cells)
- RN 26085-02-9 HCA
CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38, 52
- ST solid polymeric **electrolyte** UV crosslinking;

- polyphosphazene methoxyethoxyethoxy lithium complex crosslinking
- IT **Battery electrolytes**
(solid, lithium-poly[bis((methoxyethoxy)ethoxy)phosphazene]
complexes, UV crosslinking of, to inhibit extrusion from cells)
- IT Phosphazene polymers
((methoxyethoxy)ethoxy, lithium complexes, **electrolytes**
, UV crosslinking of solid, to inhibit extrusion from
battery cells)
- IT Crosslinking
(photochem., of lithium triflate-poly[bis((methoxyethoxy)ethoxy)p
hosphazene] solid **electrolytes**, to inhibit extrusion
from **battery** cells)
- IT 7439-93-2D, Lithium, poly[bis((methoxyethoxy)ethoxy)phosphazene]
complexes **26085-02-9D**, Poly(dichlorophosphazene), reaction
products with (methoxyethoxy)ethoxysodium, lithium complexes
(**electrolytes**, contg. trifluoromethanesulfonate, UV
crosslinking of solid, to inhibit extrusion from **battery**
cells)
- L43 ANSWER 23 OF 41 HCA COPYRIGHT 2005 ACS on STN
120:81543 Ion conductive polymer solid **electrolytes**. Armand,
Michel; Sanchez, Jean Yves; Deroo, Daniel (Centre National de la
Recherche Scientifique, Fr.; Hydro-Quebec). PCT Int. Appl. WO
9216028 A1 **19920917**, 22 pp. DESIGNATED STATES: W: CA,
JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE.
(French). CODEN: PIXXD2. APPLICATION: WO 1992-FR198 19920304.
PRIORITY: FR 1991-2715 19910307.
- AB The **electrolytes** are a solid soln. of .gtoreq.1 salts in a
polymer where the transport and mobility of a metal cation Mn^{+} with
valence $n=1-5$ is provided by .gtoreq.1 complex anion of formula
 $[MZnYp]p^{-}$ formed between an anionic ligand Z^{-} , an anionic ligand Y^{-} ,
and the cation Mn^{+} where $p=1-3$. The salt is $A(MxZzYy)$ where A is a
cation of valence $p=1$ or 2 and $p=z+y-nx$, permitting the coexistence
of anions $[MZnYp]p^{-}$ and $[MZnYp+1](p+1)^{-}$ or $[MZn+1Yp](p+1)^{-}$ or the
neutral species MZn . Examples included poly(ethylene oxide) which
was mixed in soln. with CF_3CO_2Cs and $(CF_3CO_2)_2Ni$ forming a solid
soln. contg. the complex $Ni(CF_3CO_2)_3^{-}$.
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)],
reaction products with methoxy ethoxy ethanol, metal complexes
(ionic conductive solid **electrolytes**, for
batteries)
- RN 26085-02-9 HCA
CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M006-18
ICS H01B001-12; C08K005-00; C08K003-16
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST **electrolyte** ion conductive polymer; cesium
trifluoroacetate PEO **electrolyte**; nickel trifluoroacetate
PEO **electrolyte**
- IT Rare earth metals, uses
(ion conductive solid polymer **electrolytes** contg., for
batteries)
- IT **Battery electrolytes**
(solid polymer-salt soln.)
- IT **Electrolytes**
(solid, polymer-salt)
- IT 25322-68-3D, Polyethylene oxide, metal complexes 34977-18-9D,
metal complexes 136474-71-0D, metal complexes
(ion conductive solid **electrolytes**)
- IT 65832-23-7D, metal complexes
(ion conductive solid **electrolytes** contg., for
batteries)
- IT 10186-64-8D, metal complexes 64786-16-9D, Ethylene oxide-methyl
glycidyl ether copolymer, metal complexes 129880-35-9D, metal
complexes 151582-17-1D, metal complexes 151582-19-3D, metal
complexes
(ion conductive solid **electrolytes**, for
batteries)
- IT 50-01-1 298-14-6 584-08-7, Potassium carbonate 1335-23-5,
Copper iodide 1344-13-4, Tin chloride 2638-94-0D,
Azobis(cyanovaleric)acid, metal complexes 2923-16-2, Potassium
trifluoroacetate 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses
7439-92-1, Lead, uses 7439-93-2, Lithium, uses 7439-95-4,
Magnesium, uses 7439-96-5, Manganese, uses 7439-97-6, Mercury,
uses 7440-02-0, Nickel, uses 7440-22-4, Silver, uses
7440-24-6, Strontium, uses 7440-31-5, Tin, uses 7440-43-9,
Cadmium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses
7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses 7440-69-9,
Bismuth, uses 7440-70-2, Calcium, uses 7447-40-7, Potassium
chloride, uses 7447-41-8, Lithium chloride, uses 7646-79-9,
Cobalt chloride, uses 7646-85-7, Zinc chloride, uses 7647-15-6,

Sodium bromide, uses 7681-11-0, Potassium iodide, uses 7727-15-3, Aluminum bromide 7786-30-3, Magnesium chloride, uses 7787-69-1, Cesium bromide 13400-13-0, Cesium fluoride 14171-36-9, Magnesium methylcarbonate 21907-47-1 21907-50-6, Cesium trifluoroacetate 38482-84-7, Magnesium trifluoroacetate 40621-07-6, Nickel trifluoroacetate 53801-49-3D, Europium chloride, metal complexes 151582-15-9 151582-16-0 151582-18-2 (ion conductive solid polymer **electrolytes** contg., for

batteries)

IT 111-77-3D, reaction products with polydichlorophosphazene, metal complexes **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylid yne)], reaction products with methoxy ethoxy ethanol, metal complexes 51178-85-9D, metal complexes

(ionic conductive solid **electrolytes**, for

batteries)

IT 326-91-0D, metal complexes 151582-20-6D, metal complexes 151582-21-7D, metal complexes (polymers contg., as ionic conductive solid **electrolytes**)

L43 ANSWER 24 OF 41 HCA COPYRIGHT 2005 ACS on STN

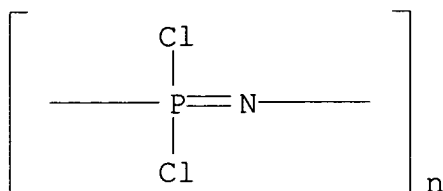
120:58445 Attempts at lithium single-ionic conduction by anchoring sulfonate anions as terminating groups of oligo(oxyethylene) side chains in comb-type polyphosphazenes. Tada, Yuji; Sato, Moriyuki; Takeno, Noboru; Nakacho, Yoshifumi; Shigehara, Kiyotaka (Fac. Eng., Muroran Inst. Technol., Muroran, 050, Japan). Chemistry of Materials, 6(1), 27-30 (English) **1994**. CODEN: CMATEX. ISSN: 0897-4756.

AB Novel comb-type polyphosphazenes with anchored Li sulfopropyl oligo(oxyethylene) side chains (SEP) were synthesized by a one-step reaction with LiHSO₃ and polyphosphazenes contg. oligo(oxyethylene) side chains terminated with allyl groups. The d.c. ionic cond. (.sigma.) of SEP was measured and compared with hybrid between LiSO₃CF₃ and the corresponding non-sulfonate comb-type polymer poly[bis[.omega.-methoxyoligo(oxyethylene)]phosphazene]. While the time dependence of .sigma./sigma.0 (sigma.0 = initial cond.) of SEP showed a const. value, that of the hybrid system drastically decreased with time due to the self-polarization by mobile anions. The stationary values of .sigma. after prolonged **electrolysis** were 7.1 .times. 10⁻⁸ S/cm for SEP and 8.5 .times. 10⁻⁷ S/cm for the hybrid at 1-V d.c. supply.

IT **26085-02-9DP**, Poly(dichlorophosphazene), reaction products with polyethylene glycol monomethyl ether and polyethylene glycol monoallyl ether, graft, sulfonated, lithium salts (comb, prepn. and elec. cond. of, for **battery electrolytes**)

RN 26085-02-9 HCA

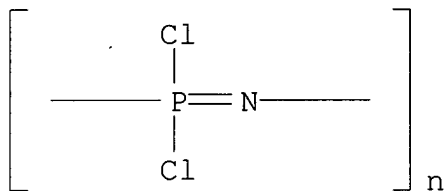
CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72, 76
- ST polyphosphazene polyoxyethylene sulfopropyl lithium prepn;
battery electrolyte polyphosphazene lithium
sulfopropyl group
- IT **Battery electrolytes**
(lithium sulfopropyl oligo(oxyethylene)-contg. polyphosphazene,
prepn. and elec. cond. of comb-like)
- IT Electric conductivity and conduction
(of comb-like lithium sulfopropyl oligo(oxyethylene)-contg.
polyphosphazene, for **battery electrolytes**)
- IT Phosphazene polymers
(polyoxyalkylene-, sulfopropyl group-contg., lithium salts,
graft, comb, prepn. and elec. cond. of, for **battery
electrolytes**)
- IT Polyoxyalkylenes, compounds
(polyphosphazene-, sulfopropyl group-contg., lithium salts,
graft, prepn. and elec. cond. of, for **battery
electrolytes**)
- IT 25231-98-5DP, Poly(hexachlorocyclotriphosphazene), reaction products
with polyethylene glycol monomethyl ether and polyethylene glycol
monoallyl ether, graft, sulfonated, lithium salts
26085-02-9DP, Poly(dichlorophosphazene), reaction products
with polyethylene glycol monomethyl ether and polyethylene glycol
monoallyl ether, graft, sulfonated, lithium salts 27274-31-3DP,
Polyethylene glycol monoallyl ether, reaction products with
poly(dichlorophosphazene) and polyethylene glycol monoethyl ether,
graft, sulfonated, lithium salts 27879-07-8DP, Polyethylene glycol
monoethyl ether, reaction products with poly(dichlorophosphazene)
and polyethylene glycol monoallyl ether, graft, sulfonated, lithium
salts
(comb, prepn. and elec. cond. of, for **battery
electrolytes**)
- L43 ANSWER 25 OF 41 HCA COPYRIGHT 2005 ACS on STN
- 114:175755 Solid polymer superionic conductors. Alamgir, M.; Moulton,
R. D.; Abraham, K. M. (EIC Lab., Inc., Norwood, MA, 02062, USA).
Proceedings - Electrochemical Society, 91-3(Proc. Symp. Primary
Second. Lithium Batteries, 1990), 131-41 (English) **1991**.

CODEN: PESODO. ISSN: 0161-6374.

- AB Li⁺-conductive solid polymer **electrolytes** having room temp. conductivities of 2 .times. 10⁻³.OMEGA.⁻¹ were synthesized by encapsulating certain mixed solvent org. **electrolytes** in a polymer network. These **electrolytes** of amorphous morphol. are prepd. as free-standing, thin films. A representative **electrolyte** comprises a soln. of LiClO₄ in a mixt. of ethylene carbonte and propylene carbonate immobilized within the support-matrix of polyacrylonitrile. Li/TiS₂ **cell** utilizing these **electrolytes** show excellent discharge performance at room temp., achieving 40% cathode utilization at the C/2 rate even in unoptimized lab. cells.
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with methoxyethoxyethanol sodium salt (superionic conductor from)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 76-2 (Electric Phenomena)
Section cross-reference(s): 38, 52
- IT **Batteries**, secondary
(lithium, superionic polymer conductors for)
- IT Diffusion
(of ferrocene in polymer **electrolytes**)
- IT Electric impedance
(of polymer **electrolytes**)
- IT Electric conductivity and conduction
(ionic, in polymers encapsulating org. **electrolytes**)
- IT Electric conductors
(superionic, polymers encapsulating org. **electrolytes**)
- IT 102-54-5, Ferrocene
(diffusion of, in polymer and liq. **electrolytes**)
- IT 33454-82-9
(elec. cond. of polymer **electrolyte** encapsulating)
- IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate
(**electrolyte** contg., superionic conductor from polymer encapsulating)
- IT 88-12-0, uses and miscellaneous 17831-71-9
(photopolymn. of, for polymer **electrolytes**)
- IT 7439-93-2, Lithium, uses and miscellaneous 12039-13-3, Titanium

disulfide

(polymer **electrolytes cells** from)

IT 7791-03-9, Lithium perchlorate

(polymer **electrolytes** contg. encapsulated)

IT 143-24-8, Tetraglyme 9003-39-8, Poly(vinylpyrrolidone)
19278-10-5D, reaction products with poly(dichlorophosphazene)
25322-68-3 25322-69-4 **26085-02-9D**,
Poly[nitrilo(dichlorophosphoranylidene)], reaction products with
methoxyethoxyethanol sodium salt 57619-91-7 90076-65-6
(superionic conductor from)

IT 25014-41-9

(superionic conductor from, encapsulating **electrolytes**)

L43 ANSWER 26 OF 41 HCA COPYRIGHT 2005 ACS on STN

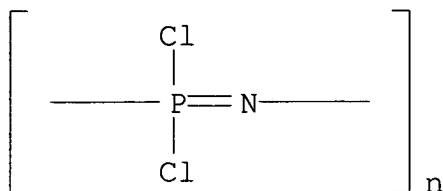
114:146870 Dimensionally stable MEEP-based polymer **electrolytes**
and solid-state lithium **batteries**. Abraham, K. M.;
Alamgir, M. (EIC Lab., Inc., Norwood, MA, 02062, USA). Chemistry of
Materials, 3(2), 339-48 (English) **1991**. CODEN: CMATEX.
ISSN: 0897-4756.

AB Several methods were developed to dimensionally stabilize
electrolytes based on poly[bis(methoxyethoxy)ethoxy]phosphaz
ene] (MEEP), using LiAlCl₄ to form free standing films. The mech.
properties of dimensionally unstable MEEP-(LiX)_n complexes (where X
= anions) can be significantly improved by forming composites PEO,
poly(propylene oxide), poly(ethylene glycol diacrylate), and
poly(vinylpyrrolidinone). A cond. of 6.7 .times. 10⁻⁵/.OMEGA.-cm at
25.degree., exhibited by a 55% MEEP/45% PEO-[LiN(CF₃SO₂)₂]_{0.13} is
among the highest values reported to date for a dimensionally stable
electrolyte. The prepn. and cond., calorimetric, and
electrochem. characterization of various **electrolytes** are
described. Cyclic voltammetric data indicate that the polymers are
anodically stable at .ltoreq.4.5 V vs. Li⁺/Li. The polymers have
excellent compatibility with Li metal, making them suitable for use
as Li⁺ conductive solid **electrolytes** in solid-state Li
batteries.

IT **26085-02-9D**, Poly(dichlorophosphazene), methoxyethoxyethyl
ethers, lithium complexes
(polymers blended with, contg. anions, as **electrolytes**
for lithium-titanium sulfide **battery**)

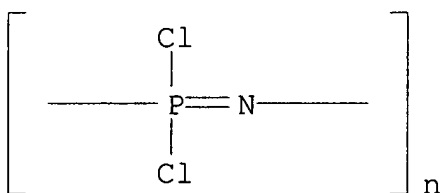
RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72, 76
- ST **battery electrolyte** polyphosphazene lithium
complex; conducting polymer **electrolyte** lithium
battery
- IT **Batteries**, secondary
(lithium-titanium disulfide, poly[bis(methoxyethoxyethoxy)phosphazene]-based **electrolyte** for, dimensional stabilization
of)
- IT Phosphazene polymers
(methoxyethoxy)ethoxy, lithium complexes, polymers blended with,
contg. anions, as **electrolytes** for lithium-titanium
sulfide **battery**)
- IT Electric conductivity and conduction
(ionic, of poly[bis(methoxyethoxyethoxy)phosphazene]-based
electrolyte, for lithium-titanium sulfide **battery**
)
- IT 7791-03-9, Lithium perchlorate 14024-11-4, Lithium
tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate
29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium
trifluoromethanesulfonate 90076-65-6
(**electrolyte**, poly[bis(methoxyethoxyethoxy)phosphazene]-
based blends contg., for lithium-titanium sulfide **battery**
)
- IT 9003-39-8, Poly(vinyl pyrrolidone) 25322-68-3 25322-69-4
28158-16-9, Poly(ethylene glycol diacrylate)
(poly[bis(methoxyethoxyethoxy)phosphazene]-based
electrolyte blended with, for lithium-titanium sulfide
battery)
- IT **26085-02-9D**, Poly(dichlorophosphazene), methoxyethoxyethyl
ethers, lithium complexes
(polymers blended with, contg. anions, as **electrolytes**
for lithium-titanium sulfide **battery**)
- L43 ANSWER 27 OF 41 HCA COPYRIGHT 2005 ACS on STN
114:124169 Polymeric solid-state **electrolytes**. Yasunami,
Shoichiro (Fuji Photo Film Co., Ltd., Japan). Jpn. Kokai Tokkyo
Koho JP 02252762 A2 **19901011** Heisei, 12 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 1989-75522 19890328.

- AB **Electrolytes** useful as antistatic agents and in **batteries**, electrochem. devices, etc. comprise Group IA and IIA metal salts and polyphosphazenes bearing pendant polyoxyalkylene groups. Thus, adding 4 g polydichlorophosphazene in 500 mL THF to HOCH(CH₂OCH₂CH₂OCH₂CH₂OCH₃)₂ 30, THF 200, and 60% NaH 28 g over 3 h, adding 0.1 g Bu₄N⁺ Br⁻, and, after 24 h at room, refluxing for 2 h gave a polyphosphazene (I) with pendant polyoxyalkylene chains. Casting a 3% THF soln. of I and LiCF₃SO₃ (polyoxyethylene-Li ratio 8:1) gave a film with elec. cond. 8.2 .times. 10⁻⁴ S/cm at 15.degree. and tensile strength 300 g.
- IT **26085-02-9D**, Hexachlorocyclotriphosphazene polymer, SRU, polyoxyalkylene derivs.
(solid **electrolytes**, contg. metal salts)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM C08L085-02
ICS C08K003-10; H01M006-18; H01M010-36; H05F001-00
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 76
- ST antistatic film solid **electrolyty**; solid **electrolyte** polyphosphazene polyoxyalkylene; lithium salt solid **electrolyte**; trifluoromethanesulfonate lithium solid **electrolyte**
- IT Alkaline earth compounds
(solid **electrolytes**, contg. polyphosphazene-polyoxyalkylenes)
- IT Phosphazene polymers
(polyoxyalkylene-, solid **electrolytes**, contg. metal salts)
- IT Polyoxyalkylenes, uses and miscellaneous
(polyphosphazene-, solid **electrolytes**, contg. metal salts)
- IT Alkali metals, compounds
(salts, solid **electrolytes**, contg. polyphosphazene-polyoxyalkylenes)
- IT **Electrolytes**
(solid, polyphosphazene-polyoxyalkylene mixts. with metal salts as)
- IT 25231-98-5D, Hexachlorocyclotriphosphazene polymer, polyoxyalkylene

derivs. **26085-02-9D**, Hexachlorocyclotriphosphazene polymer, SRU, polyoxyalkylene derivs. 87105-03-1D, 2,5,8,12,15,18-Hexaoxonadecan-10-ol, reaction products with polyphosphonitrilic chloride

(solid **electrolytes**, contg. metal salts)

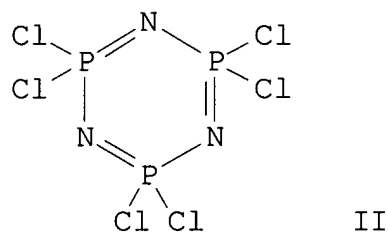
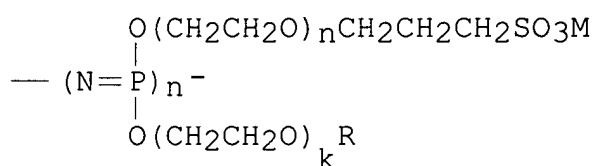
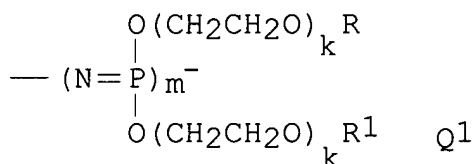
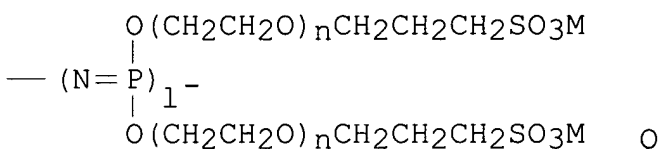
IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium trifluoromethanesulfonate

(solid **electrolytes**, contg. polyphosphazene-polyoxyalkylenes)

L43 ANSWER 28 OF 41 HCA COPYRIGHT 2005 ACS on STN

114:43173 Preparation of polyphosphazenes as **electrolytes** for secondary **batteries**. Nakanaga, Takefumi; Tada, Yuji (Otsuka Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 02193999 A2 **19900731** Heisei, 10 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1989-12830 19890120.

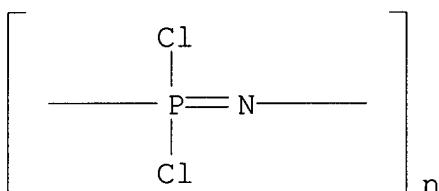
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AB $[[\text{N}:\text{P}(\text{Z})_2](\text{MX})_a]_b$ (I; M = Group I, II, III-VII, transition metal, lanthanide, and onium ions; X = anion; N:P(Z)₂ = any combination of Q, Q1, and/or Q2 wherein R, R¹ = Me, Et, Pr; 0 .ltoreq. h .ltoreq. 15; 0 .ltoreq. k < 22.5; a = 0.001-4; l, m, n = 0, integer; 3 .ltoreq. b = l + m + n .ltoreq. 20,000) are prepd. BuLi in hexane was added dropwise to a soln. of HO(CH₂CH₂O)₇Me and HO(CH₂CH₂O)₇CH₂CH:CH₂ in THF at -20.degree. to -10.degree., II was added, the mixt. was melted on heating, solidified on cooling, degassed, and heated was dissolved in dioxane and treated with EtOLi at -15.degree. to 10.degree., the mixt. was refluxed to give allyl ether intermediate which was treated with Li₂SO₃ and LiHSO₃ at

70-53.degree. to give 92% [N:P[O(CH₂CH₂O)6.5Me]1.62[O(CH₂CH₂O)6.5CH₂CH₂CH₂SO₃Li]0.38]n. Also prepd. were 14 addnl. I which showed good elec. cond.

- IT **26085-02-9DP**, Poly[nitrilo(dichlorophosphoranylidene)], reaction products with polyethylene glycol monomethyl ether, polyethylene glycol monoallyl ether and lithium sulfite (prepn. of, as **electrolyte** for secondary **battery**)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



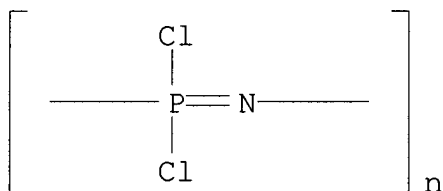
- IC ICM C07F009-24
ICS H01M010-40
- CC 29-7 (Organometallic and Organometalloidal Compounds)
Section cross-reference(s): 76
- ST polyphosphazene prepn **electrolyte** secondary **battery**
- IT **Batteries**, secondary
(**electrolytes** for, polyphosphazenes as)
- IT Phosphazene polymers
(prepn. of, as secondary **battery electrolytes**)
- IT **26085-02-9DP**, Poly[nitrilo(dichlorophosphoranylidene)], reaction products with polyethylene glycol monomethyl ether, polyethylene glycol monoallyl ether and lithium sulfite
26085-02-9DP, Poly[nitrilo(dichlorophosphoranylidene)], reaction products with polyethylene glycol monomethyl ether, polyethylene glycol monoallyl ether and potassium bisulfite (prepn. of, as **electrolyte** for secondary **battery**)
- L43 ANSWER 29 OF 41 HCA COPYRIGHT 2005 ACS on STN
113:232301 Fluoroalkylsulfonyl group-containing oligoalkyleneoxypolyphosphazenes and their manufacture and uses. Nakanaga, Takefumi; Tada, Yuji; Inubushi, Akiyoshi (Otsuka Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 02169628 A2 **19900629** Heisei, 11 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1988-324364 19881221.
- AB The title polymers useful as solid **electrolytes** with high elec. cond. and desired ion transference near 100%, for

batteries of high charge-discharge cycles contain segment chosen from $[-N:PQ_2-]_l$, $[-N:PQ_2]_m$, and $[-N:PQ_1-]$ [$Q = O(CH_2CH_2O)hCH_2CH_2CHFCF_2SO_3M$; $Q_1 = O(CH_2CH_2O)kk'$; $M = H$, onium, alkali metal; $R = H$, Me; $R' = Me$, Et, Pr; $h = 0-18$; $k = 0-20$; $(l + m + n) = 3-200,000$; $(l + n) \neq 0$]. A soln. of 7.7 g $LiO_3SCF_2CHFCCH_2CH_2OCH_2CH_2OH$ and 22.8 g $MeOCH_2CH_2OH$ in 500 mL THF was treated over 30 min at -20° to -10° with 0.30 mol BuLi in hexane, treated over 45 min with a soln. of 0.10 unit mol (11.6 g) dichlorophosphonitrile polymer in 200 mL dioxane at -15° to -10° to give 35 g slightly yellow rubbery product $[-NP(OCH_2CH_2OMe)_{1.818}(OCH_2CH_2OCH_2CH_2CHFCF_2SO_3Li)_{0.182}-]$, with mol. wt. 150,000, Li content 0.6%, elec. cond. 0.7×10^{-5} S/cm, and transference no. (Li+) 0.99.

IT **26085-02-9DP**, Poly[nitrilo(dichlorophosphoranylidene)], reaction products with lithium- and fluorine-contg. alcs. (manuf. of, for solid **electrolytes** for **batteries**)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



IC ICM C08G079-04

ICS H01M010-40

CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 52

ST phosphazene polymer solid **electrolyte battery**;
lithium contg phosphazene polymer **battery**

IT Fluoropolymers
(phosphazene polymer derivs., for **batteries**)

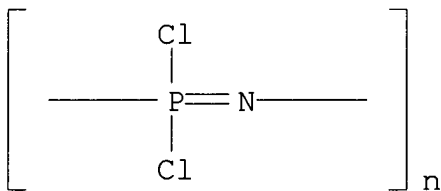
IT **Batteries**, secondary
(solid **electrolytes** for, lithium- and fluorine-contg.
polyoxyalkylene-phosphazene polymers for)

IT Phosphazene polymers
(polyoxyalkylene-, fluorine- and sulfo-contg., graft, manuf. of,
for solid **electrolytes** for **batteries**)

IT Fluoropolymers
(polyoxyalkylene-polyphosphazene-, sulfo-contg., graft, manuf.
of, for solid **electrolytes** for **batteries**)

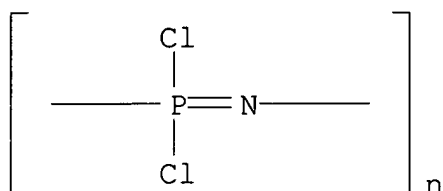
IT Polyoxyalkylenes, preparation
(polyphosphazene-, fluorine- and sulfo-contg., graft, manuf. of,
for solid **electrolytes** for **batteries**)

- IT Polyelectrolytes
(solid, phosphazene polymer derivs., for **batteries**)
- IT 75-56-9DP, reaction products with dichlorophosphonitrile polymer
109-86-4DP, reaction products with dichlorophosphonitrile polymer
9004-74-4DP, reaction products with dichlorophosphonitrile polymer
26085-02-9DP, Poly[nitrilo(dichlorophosphoranylidyne)],
reaction products with lithium- and fluorine-contg. alcs.
130556-00-2DP, reaction products with dichlorophosphonitrile polymer
(manuf. of, for solid **electrolytes** for
batteries)
- L43 ANSWER 30 OF 41 HCA COPYRIGHT 2005 ACS on STN
- 112:220310 Polyphosphazene solid state polymeric **electrolytes**
for lithium energy storage devices. Palmer, David N. (Combust.
Eng., Inc., Windsor, CT, 06095-0500, USA). Proceedings -
Electrochemical Society, 90-5(Proc. Symp. Rechargeable Lithium
Batteries, 1989), 245-61 (English) **1990**. CODEN: PESODO.
ISSN: 0161-6374.
- AB ESCA and solvatochromic modeling data indicate that
poly(2[(2-methoxyethoxy)ethoxy]phosphazene)-Li salt complexes have
suitable properties for use as **electrolytes** in Li
batteries operating at room temp. Complex impedance, ionic
cond., and **battery** cycling data indicate that
electrolyte performance is dependent on polymer synthesis
methods, substituent groups, Li anode reactive species, and polymer
film stability.
- IT **26085-02-9D**, Poly(dichlorophosphazene), ethoxy and methoxy
group contg., lithium complexes
(impedance and ionic cond. of, for lithium **battery**
electrolyte use)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST polyoxyphosphazene lithium salt **electrolyte**
battery; ionic cond polyoxyphosphazene lithium salt
- IT **Batteries**, secondary
(lithium, polyphosphazene-lithium salt **electrolytes**
for, properties of)

- IT Phosphazene polymers
((methoxyethoxy)ethoxy, lithium complexes, impedance and ionic cond. of, for lithium **battery electrolyte** use)
- IT Electric conductivity and conduction
(ionic, of polyphosphazene-lithium salt **electrolytes**, anion effect on)
- IT 7439-93-2D, Lithium, polyphosphazene complexes
(impedance and ionic cond. of, anion effect on, for lithium **battery electrolyte** use)
- IT **26085-02-9D**, Poly(dichlorophosphazene), ethoxy and methoxy group contg., lithium complexes
(impedance and ionic cond. of, for lithium **battery electrolyte** use)
- L43 ANSWER 31 OF 41 HCA COPYRIGHT 2005 ACS on STN
- 112:59719 Thermally actuated hydrogen secondary **battery**.
Palmer, David N.; Cartwright, John S.; O'Neill, James K. (Combustion Engineering, Inc., USA). U.S. US 4847174 A **19890711**, 6 pp. (English). CODEN: USXXAM. APPLICATION: US 1985-809898 19851217.
- AB The **battery** comprises an anode of a thermally actuated anode-active, solid, reversible H-contg. inorg. compd.; a compatible, gas-free **electrolyte** capable of transporting H⁺ ions between the anode and cathode when the anode is heated; and a cathode of a H⁺ ion-intercalatable cathode-active material. In a discharge cycle and when anode is heated, the anode inorg. compd. deintercalates and the cathode intercalates H⁺ ions. The possible anode inorg. compds. are metal hydride, hydride of transition metal intermetallic compd., H intercalate of transition metal sulfide or oxide, etc.; the possible cathode-active materials are an alkali or alk. earth metal, a transition metal, a transition metal intermetallic compd., a transition metal sulfide or oxide, etc.; and the solid **electrolyte** is a complex of trifluoromethanesulfonic acid with a linear polymer. The operation principles of the invention **battery** are illustrated by various half-cell and overall-cell discharge reactions, such as for a **battery** having a gas-free liq. or solid **electrolyte** or proton ionic conductor, a LaNi₅H₆ anode, and a V6013 cathode.
- IT **26085-02-9D**, Poly(dichlorophosphazene), reaction products with methoxyethoxyethanol or phenol
(**electrolytes** contg. trifluoromethanesulfonic acid and, for thermally actuated hydrogen **batteries**)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- IC ICM H01M006-36
ICS H01M006-16; H01M004-58
INCL 429112000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 56
ST **battery** hydrogen vanadium oxide; anode lanthanum nickel
compd hydrogen; cathode **battery** vanadium oxide;
trifluoromethanesulfonic acid polymer **battery**
electrolyte
IT Phosphazene polymers
(difluoroalkoxy, **electrolytes** contg.
trifluoromethanesulfonic acid and, for thermally actuated
hydrogen **batteries**)
IT **Batteries**, secondary
(hydrogen, thermally actuated)
IT Cathodes
(**battery**, hydrogen-intercalatable)
IT 1493-13-6, Trifluoromethanesulfonic acid
(**electrolytes** contg. polymers and, for thermally
actuated hydrogen **batteries**)
IT 108-95-2D, Phenol, reaction products with poly(dichlorophosphazene)
111-77-3D, Methoxyethoxy ethanol, reaction products with
poly(dichlorophosphazene) 25322-68-3, Poly(ethylene oxide)
25322-69-4, Poly(propylene oxide) **26085-02-9D**,
Poly(dichlorophosphazene), reaction products with
methoxyethoxyethanol or phenol 27290-47-7,
Poly(difluorophosphazene)
(**electrolytes** contg. trifluoromethanesulfonic acid and,
for thermally actuated hydrogen **batteries**)
IT 12017-68-4, Co5Sm 12018-27-8 12023-04-0, FeTi 12057-65-7
12196-72-4 12323-63-6 88121-11-3
(hydrogen-absorbing, anodes, for thermally actuated
batteries)
IT 1313-27-5, Molybdenum oxide (MoO3), uses and miscellaneous
1314-35-8, Tungsten oxide (WO3), uses and miscellaneous 1314-62-1,
Vanadium oxide (V2O5), uses and miscellaneous 12037-42-2, Vanadium
oxide (V6O13)
(hydrogen-intercalatable, cathodes, for thermally actuated
batteries)

IT 7439-91-0, Lanthanum, uses and miscellaneous 7439-95-4, Magnesium, uses and miscellaneous 7440-23-5, Sodium, uses and miscellaneous 7440-61-1, Uranium, uses and miscellaneous 7440-70-2, Calcium, uses and miscellaneous 12138-09-9, Tungsten disulfide 13870-10-5, Iron chloride oxide (FeOCl) 20642-13-1, Nickel phosphide sulfide (NiPS₃) 123714-60-3 123714-61-4 123714-62-5 123714-63-6 123744-92-3, Titanium carbide (TiC₁₋₃) 123744-93-4, Tantalum carbide (TaC₃₋₅) 123744-94-5, Tungsten carbide (WC₁₋₃) 124029-70-5, Nickel chloride oxide (NiClO)

(hydrogen-intercalatable, electrodes, for thermally actuated **batteries**)

L43 ANSWER 32 OF 41 HCA COPYRIGHT 2005 ACS on STN

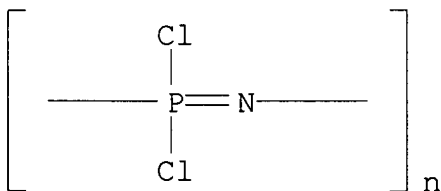
111:118132 Impedance studies on the system lithium perchlorate-poly[bis(methoxyethoxyethoxy)phosphazene] (MEEP). Jacobs, P. W. M.; Lorimer, J. W.; Russer, A.; Wasiucionek, M. (Dep. Chem., Univ. West. Ontario, London, ON, N6A 5B7, Can.). Journal of Power Sources, 26(3-4), 483-9 (English) **1989**. CODEN: JPSODZ. ISSN: 0378-7753.

AB Impedance measurements on the system MEEP-LiClO₄ (for **battery electrolyte**) were carried out using Ni electrodes, at -50.degree. to +80.degree. and 0.1 mHz-65 kHz, for compns. n = 2-30 in (MEEP)_nLiClO₄. The data were analyzed using a model which includes 2 conduction paths: along the polymer chains and between the chains. Each of these paths may be simulated by a bulk resistance and a parallel dielec. capacitance. Since these paths do not extend right across the **electrolyte**, these circuit elements act in series. Because the electrode-**electrolyte** contact is not perfectly smooth, there is, in addn., a const. phase element in series with the 2 parallel resistance/ capacitance networks.

IT **26085-02-9D**, Poly(dichlorophosphazene), bis(methoxyethoxyethoxy) deriv., lithium complexes (**electrolytes**, with perchlorate, impedance of, for **batteries**)

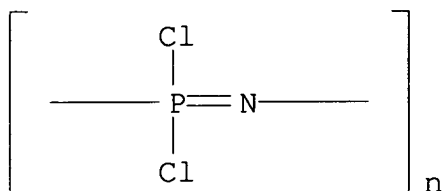
RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)

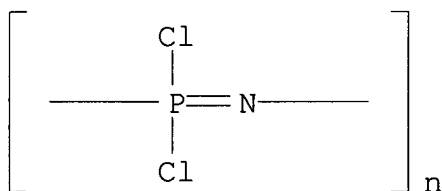


CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76

- ST **battery electrolyte** polyphosphazene lithium perchlorate; impedance polyphosphazene lithium perchlorate; conducting polymer polyphosphazene **electrolyte battery**
- IT **Batteries**, primary
(poly[bis(methoxyethoxyethoxy)phosphazene]-lithium perchlorate **electrolyte** for, impedance of)
- IT Phosphazene polymers
(methoxyethoxy)ethoxy, lithium complexes, **electrolytes**, with perchlorate, impedance of, for **batteries**)
- IT Electric conductivity and conduction
(ionic, of poly[bis(methoxyethoxyethoxy)phosphazene]-lithium perchlorate **electrolyte**)
- IT 7439-93-2D, Lithium, poly[bis(methoxyethoxyethoxy)phosphazene] complexes **26085-02-9D**, Poly(dichlorophosphazene), bis(methoxyethoxyethoxy) deriv., lithium complexes (**electrolytes**, with perchlorate, impedance of, for **batteries**)
- IT 7791-03-9, Lithium perchlorate (**electrolytes**, with poly[bis(methoxyethoxyethoxy)phosphazene], impedance of, for **batteries**)
- L43 ANSWER 33 OF 41 HCA COPYRIGHT 2005 ACS on STN
111:106614 Effect of .gamma.-radiation on the structure and ionic conductivity of 2-(2-methoxy-ethoxy-ethoxy)polyphosphazene + lithium trifluoromethane sulfonate (LiCF₃SO₃). Nazri, G.; Meibuhr, S. G. (Phys. Chem. Dep., Gen. Mot. Res. Lab., Warren, MI, 48090, USA). Proceedings - Electrochemical Society, 89-4(Proc. Symp. Mater. Processes Lithium Batteries, 1988), 332-46 (English) **1989**. CODEN: PESODO. ISSN: 0161-6374.
- AB The ionically conducting polymer 2-(2-methoxy-ethoxy-ethoxy)polyphosphazene contg. Li trifluoromethane sulfonate is a possible **electrolyte** for high-energy d. Li **batteries**. A.C. impedance measurements were made on this material to det. its Li ion cond. Fourier-transform (FT) IR spectra were obtained to det. its mol. structure. The cond. at 22.degree. was detd. to be 7 .times. 10⁻⁴ (.OMEGA.-cm)⁻¹ using inert electrodes. The material was subjected to .gamma.-irradn. using a 60Co source in an attempt to crosslink the polymer. Impedance and FT-IR measurements were made after the irradn. These results showed that crosslinking occurred during irradn. The polymer exhibited the same cond. as it had before the irradn. and it was highly viscous.
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)], reaction products
(structure and ionic cond. of, .gamma.-ray irradn. effect on)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



- CC 76-2 (Electric Phenomena)
Section cross-reference(s): 52
- IT 19278-10-5D, reaction products **26085-02-9D**,
Poly[nitrilo(dichlorophosphoranylidyne)], reaction products
(structure and ionic cond. of, .gamma.-ray irradiation effect on)
- L43 ANSWER 34 OF 41 HCA COPYRIGHT 2005 ACS on STN
111:10199 Polyphosphazene-based solid-state secondary lithium
batteries. Alamgir, M.; Reynolds, R. K.; Abraham, K. M.
(EIC Lab., Inc., Norwood, MA, 02062, USA). Proceedings -
Electrochemical Society, 89-4(Proc. Symp. Mater. Processes Lithium
Batteries, 1988), 321-31 (English) **1989**. CODEN: PESODO.
ISSN: 0161-6374.
- AB Li salt-poly[bis-(methoxyethoxyethoxide)phosphazene] was blended
with high mol. wt. PEO forming a polymer **electrolyte** with
high dimensional stability, thermal stability to
.ltoreq.180.degree., and high ionic cond., for use in Li/TiS2
batteries. Composites contg. LiClO4 and LiBF4 had the
highest cond. among the **electrolytes** studied.
- IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)],
reaction product with (methoxyethoxyethanol)
(**electrolytes**, contg. lithium salt and PEO, ionic cond.
and dimensional stability of, for lithium **batteries**)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST lithium salt polyphosphazene PEO **electrolyte**; ionic cond
lithium salt polyphosphazene; conducting polymer **electrolyte**
PEO polyphosphazene; titanium sulfide **battery** polymer
electrolyte

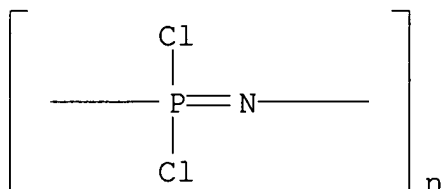
- IT Electric conductors
(polyphosphazene-PEO-lithium salt, **electrolytes**, for lithium-titanium sulfide **batteries**)
- IT Electric conductivity and conduction
(ionic, of polyphosphazene-PEO **electrolytes**, lithium salt compn. and temp. effects on)
- IT **Batteries**, secondary
(solid-**electrolyte**, lithium-titanium sulfide, lithium salt-polyphosphazene-PEO **electrolytes** for, dimensional stability and cond. of)
- IT 111-77-3D, reaction product with poly(dichlorophosphazene) **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction product with (methoxyethoxyethanol)
(**electrolytes**, contg. lithium salt and PEO, ionic cond. and dimensional stability of, for lithium **batteries**)
- IT 7791-03-9, Lithium perchlorate (LiClO_4) 14283-07-9, Lithium tetrafluoroborate (LiBF_4) 29935-35-1, Lithium hexafluoroarsenate (LiAsF_6) 33454-82-9
(**electrolytes**, contg. polyphosphazene and PEO, dimensional stability and cond. of, for lithium **batteries**)
- IT 25322-68-3, PEO
(**electrolytes**, contg. polyphosphazene and lithium salt, dimensional stability and cond. of, for lithium **batteries**)

L43 ANSWER 35 OF 41 HCA COPYRIGHT 2005 ACS on STN

110:216231 Polyphosphazene **electrolytes** for lithium **batteries**. Nazri, Gholamabbas; MacArthur, Donald M.; Ogara, John F. (Gen. Mot. Res. Lab., Warren, MI, 48090-9055, USA). Chemistry of Materials, 1(3), 370-4 (English) **1989**. CODEN: CMATEX. ISSN: 0897-4756.

AB Poly([2-(2-methoxyethoxy)ethoxy]phosphazene), (I), doped with Li salts, is a useful **electrolyte** for solid-state Li **batteries**. Characterization of I by cond. measurements, NMR, and FTIR spectroscopy techniques, and observations of electrochem. activity related to Li **batteries** are reported. The ^{31}P , ^{13}C , and ^1H NMR spectra show characteristic peaks related to polyphosphazene and an ether side chain with minor crosslinking. FTIR spectra show that Li is weakly assocd. with ethoxide groups of the polymer and resides in an energy well .apprx.0.045 eV deep. The cond. of undoped I is (2.5-5.0) .times. $10^{-7}/\text{OMEGA.-cm}$; at a doping level of 0.17 mol of LiCF_3SO_3 per mol of monomer equiv., the cond. is .apprx.2.5 .times. 10^{-5} , at ambient temp. Cyclic voltammetry shows inefficiencies in the Li redox reaction. The operation of a Li/I-(LiClO_4)/ TiS_2 cell at 30 .mu.A/cm 2 on charge and 50 .mu.A/cm 2 on discharge indicates polarization during deintercalation of Li from TiS_2 .

IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with sodium (methoxyethoxy) ethoxide, lithium complex
 (electrolytes, contg. trifluoromethanesulfonate or perchlorate, for lithium **batteries**)
 RN 26085-02-9 HCA
 CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38, 72, 76
 ST lithium salt polyphosphazene **electrolyte battery**
 ; titanium sulfide lithium polyphosphazene **battery**;
 conducting polymer polyphosphazene **electrolyte battery**
 IT Electric conductivity and conduction
 Electric impedance
 Infrared spectra
 (of lithium salt-doped poly[(methoxyethoxy)ethoxy]phosphazene **electrolyte**, for lithium **batteries**)
 IT Electric conductors
 (polyphosphazene, lithium salt-doped, **electrolytes**, properties of, for lithium **batteries**)
 IT **Batteries**, secondary
 (solid-electrolyte, lithium-titanium disulfide, with lithium salt-doped poly[(methoxyethoxy)ethoxy]phosphazene **electrolyte**, performance of)
 IT 19278-10-5D, reaction products with poly(hexachlorotriazatriphosphorine), lithium complex 25231-98-5D, reaction products with sodium (methoxyethoxy)ethoxide, lithium complex **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidyne)], reaction products with sodium (methoxyethoxy) ethoxide, lithium complex
 (electrolytes, contg. trifluoromethanesulfonate or perchlorate, for lithium **batteries**)
 IT 7439-93-2D, Lithium, poly[(methoxyethoxy)ethoxy]phosphazene complexes
 (electrolytes, contg. trifluoromethanesulfonate or perchlorate, properties of, for lithium **batteries**)
 IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium trifluoromethanesulfonate
 (electrolytes, with polyphosphazene, properties of, for

lithium **batteries**)

L43 ANSWER 36 OF 41 HCA COPYRIGHT 2005 ACS on STN

109:234195 Anion-immobilized phosphazene polymer solid

electrolytes. Matsuki, Toshitsugu; Saiki, Noritsugu (Teijin Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 63186737 A2**19880802** Showa, 5 pp. (Japanese). CODEN: JKXXAF.

APPLICATION: JP 1987-17223 19870129.

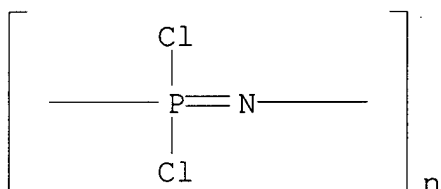
AB Polyphosphazenes, having structural repeating unit $N:P(OR)_2$ [R = (substituted) aliph., alicyclic, or arom. group and 1-50% of R is R_1CO_2M ; R_1 = (substituted) aliph., alicyclic, arom. group; and M = alkali metals], are used as **electrolytes** for secondary **batteries**, chem. industries, and medical apps. Thus, a reaction product of p-hydroxybenzoic acid and LiOH was mixed with THF soln. of poly[bis(2-methoxyethoxy)phosphazene] and refluxed to give phosphazene polymer film having 35% of 2-methoxyethyl groups substituted with Li benzoate moiety. The prepd. polyphosphazene had an ionic cond. of 7.1 .times. 10^{-4} S/cm after applying a 3-V d.c. across the film for 15 min.

IT **26085-02-9D**, bis(2-methoxyethoxy) group-contg., reaction products with p-hydroxybenzoic acid lithium salt

(solid **electrolyte**, anion-immobilized ion-cond., for **batteries** and electrochem. devices)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



IC ICM C08G079-02

ICS C08G079-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST polyphosphazene lithium oxybenzoate deriv **electrolyte**;
anion immobilized polyphosphazene solid **electrolyte**

IT **Batteries**, secondary
(**electrolytes** for, solid, anion-immobilized
polyphosphazene, manuf. of)

IT Phosphazene polymers
(solid **electrolyte**, anion-immobilized ion-cond., for
batteries and electrochem. devices)

IT **Electrolytes**
(solid, anion-immobilized polyphosphazene derivs. for, manuf. of)

IT **26085-02-9D**, bis(2-methoxyethoxy) group-contg., reaction products with p-hydroxybenzoic acid lithium salt 61937-89-1D, reaction products with poly[bis(2-methoxyethoxy)phosphazene] (solid **electrolyte**, anion-immobilized ion-cond., for **batteries** and electrochem. devices)

L43 ANSWER 37 OF 41 HCA COPYRIGHT 2005 ACS on STN

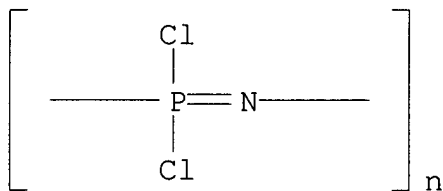
109:193831 Polymer solid **electrolytes** containing polyphosphazenes. Matsuki, Toshitsugu; Saiki, Noritsugu (Teijin Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 63186766 A2 **19880802** Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1987-17224 19870129.

AB The title **electrolytes**, useful in secondary **batteries**, chem. industries, and medical apps., consist of phosphazene polymers mainly having structural repeating unit N:P(OR)₂ [R = (substituted) aliph., alicycli, arom.; .gtoreq.10% of R having .gtoreq.1 amide group] and metal salts at a mol ratio of repeating unit/metal salt .apprx.104-0.2. Thus, a reaction product of 2-aminoethanol and Na was refluxed with poly[bis(2-methoxyethoxy)phosphazene] to give a polyphosphazene having 21 mol% of 2-methoxyethoxy groups substituted with 2-aminoethoxy groups. The prepd. polymer was treated to remove HCl, stirred with propionyl chloride for amidation, and then mixed with LiClO₄ to give a solid **electrolyte** having ion cond. 4.2 .times. 10⁻³ S/cm at 22.degree..

IT **26085-02-9D**, Poly[nitrilo(dichlorophosphoranylidene)], bis(2-methoxyethoxy) group-contg., reaction products with 2-aminoethanol and propionic acid chloride (amido, manuf. of solid **electrolytes** from lithium perchlorate and, for high ion-cond.)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



IC ICM C08L085-02

ICS C08K003-10

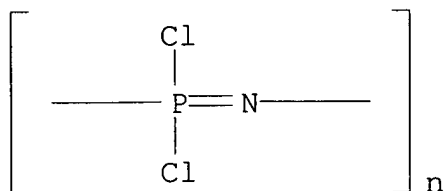
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 38

ST polyphosphazene metal salt solid **electrolyte**;

battery solid polymer **electrolyte**

IT Phosphazene polymers

- (alkoxy, amido, manuf. of solid **electrolytes** from lithium perchlorate and, for high ion-cond.)
- IT Phosphazene polymers
(methoxyethoxy propionamidoethoxy, solid **electrolytes** from lithium perchlorate and, with high ion-cond.)
- IT **Electrolytes**
(solid, polyphosphazene lithium salts)
- IT **Electrolytes**
(solid, polyphosphazene-lithium salt, for electrochem. and medical instrument industries)
- IT **Batteries, secondary**
(solid-**electrolyte**, polyphosphazene-lithium salt as)
- IT 79-03-8D, Propionic acid chloride, reaction products with poly[bis(2-methoxyethoxy)phosphazene] and 2-aminoethanol
141-43-5D, reaction products with poly[bis(2-methoxyethoxy)phosphazene] and propionic acid chloride
26085-02-9D, Poly[nitrilo(dichlorophosphoranylidyne)], bis(2-methoxyethoxy) group-contg., reaction products with 2-aminoethanol and propionic acid chloride
(amido, manuf. of solid **electrolytes** from lithium perchlorate and, for high ion-cond.)
- IT 7791-03-9
(solid **electrolytes** from polyphosphazenes and, high ion-cond.)
- L43 ANSWER 38 OF 41 HCA COPYRIGHT 2005 ACS on STN
108:134904 Rechargeable solid-state lithium **batteries** utilizing polyphosphazene-poly(ethylene oxide) mixed polymer **electrolytes**. Abraham, K. M.; Alamgir, M.; Perrotti, S. J. (EIC Lab., Inc., Norwood, MA, 02062, USA). Journal of the Electrochemical Society, 135(2), 535-6 (English) **1988**. CODEN: JESOAN. ISSN: 0013-4651.
- AB Rechargeable Li/TiS₂ **batteries** with **electrolytes** of PEO/poly(bis(methoxyethoxyethoxide)phosphazene)(I) solvating polymer mixt.-LiClO₄ or LiCF₃SO₃ have excellent dimensional stability and rate capability at 50.degree.. The cond. of the PEO-I based **electrolyte** is higher than that of PEO-based **electrolytes**. **Electrolytes** prepd. with LiClO₄ have a higher cond. and better pinhole morphol. than those contg. LiCF₃SO₃.
- IT **26085-02-9D**, reaction product with methoxyethoxyethoxide (**electrolyte** contg. PEO and, with lithium perchlorate and lithium trifluoromethanesulfonate, for **batteries**)
- RN 26085-02-9 HCA
- CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST PEO polymethoxyethoxyethoxide phosphazene **electrolyte**
battery; lithium perchlorate PEO **electrolyte**
battery; **battery** lithium titanium sulfide
electrolyte
- IT Phosphazene polymers
(**electrolyte** contg. PEO and, with lithium perchlorate
and lithium trifluoromethanesulfonate, for **batteries**)
- IT **Batteries**, secondary
(lithium-titanium sulfide, PEO/polymethoxyethoxidephosphazene-
based **electrolytes** for)
- IT Electric conductivity and conduction
(of PEO-polymethoxyethoxidephosphazene/lithium perchlorate or
lithium trifluoromethanesulfonate **electrolytes**)
- IT **26085-02-9D**, reaction product with methoxyethoxyethoxide
(**electrolyte** contg. PEO and, with lithium perchlorate
and lithium trifluoromethanesulfonate, for **batteries**)
- IT 25322-68-3, PEO
(**electrolytes** contg. polymethoxyethoxidephosphazene
and, with lithium perchlorate and lithium trifluoromethane
sulfonate, for **batteries**)
- IT 7791-03-9, Lithium perchlorate (LiClO₄) 33454-82-9
(**electrolytes** of PEO and polymethoxyethoxidephosphazene
and, for lithium-titanium sulfide **batteries**)
- L43 ANSWER 39 OF 41 HCA COPYRIGHT 2005 ACS on STN
106:159535 Secondary solid-state solid polymer **electrolyte**
cells. Semkow, Krystyna W.; Sammells, Anthony F. (Eltron
Res., Inc., Aurora, IL, 60505, USA). Journal of the Electrochemical
Society, 134(3), 766-7 (English) **1987**. CODEN: JESOAN.
ISSN: 0013-4651.
- AB A Li_xWO₂/LiCF₃SO₃ [33454-82-9]-poly[bis(2-(2-
methoxyethoxy)ethoxy)phosphazene](I)/TiS₂ **battery** had a
c.d. of 80 .mu.A/cm² at 1.9 V, good electrochem. reversibility, and
superior lifetime. A Cr₂O₃-.beta.-alumina/CF₃SO₃Na [2926-30-9]-PEO
[25322-68-3]-PEG [25322-68-3]/Fe oxide-.beta.-alumina
battery had an open-circuit voltage of 1.5 V (after charging
at 1.25 mA-h/cm²) and a good recovery of charge capacity and

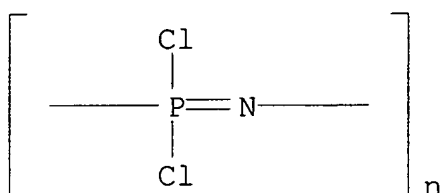
electrochem. reversibility. The **batteries** contg. I or PEO-PEG mixts. in the solid **electrolyte** had better performance and lifetime than those of **batteries** contg. only PEO. The metal-.beta. alumina electrode manuf. is described.

IT **26085-02-9D**, reaction products with methoxyethoxyethanol sodium salt

(**electrolytes** contg., for solid-state secondary **batteries**)

RN 26085-02-9 HCA

CN Poly[nitrilo(dichlorophosphoranylidene)] (8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST **battery** polymer **electrolyte** lifetime
reversibility; polyphosphazene PEO PEG **electrolyte**
battery; electrode alumina metal oxide polymer

IT 11138-49-1

(electrodes, in **batteries**, with polyphosphazene and PEO
and PEG **electrolytes**)

IT 2926-30-9, Sodium trifluoromethanesulfonate 19278-10-5D, reaction
products with poly(dichlorophosphazene) 25322-68-3, PEG
26085-02-9D, reaction products with methoxyethoxyethanol
sodium salt 33454-82-9, Lithium trifluoromethanesulfonate
(**electrolytes** contg., for solid-state secondary
batteries)

IT 7439-89-6, uses and miscellaneous 7439-93-2, uses and
miscellaneous 7439-95-4, uses and miscellaneous 7440-47-3, uses
and miscellaneous
(in alumina electrodes, in **batteries**, with
polyphosphazene and PEO and PEG **electrolytes**)

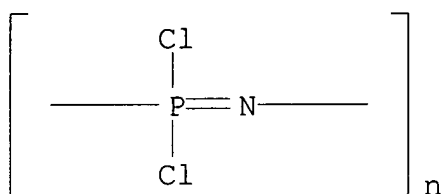
L43 ANSWER 40 OF 41 HCA COPYRIGHT 2005 ACS on STN

103:187405 Complex formation, conductivity and lithium ion transport in
polyphosphazene-based solid **electrolytes**. Blonsky, Peter
Miller; Shriver, Duward F.; Austin, P.; Allcock, H. R. (Mater. Res.
Cent., Northwestern Univ., Evanston, IL, 60201, USA). Polymeric
Materials Science and Engineering, 53, 118-22 (English) **1985**
. CODEN: PMSEDG. ISSN: 0743-0515.

AB A new polymer, poly[bis(methoxyethoxyethoxide)phosphazene] (I) was
synthesized and its complexes with Li salts esp. LiBF₄ were studied

as possible **electrolytes** for thin-film **batteries** and for other electrochem. applications. The high ionic cond. and high transport no. of Li along with thin-film processability are all favorable characteristics not obtained with PEO based complexes. Models for ion transport in solvent-free polymer/salt complexes are substantiated by the cond. properties of these Li-I complexes.

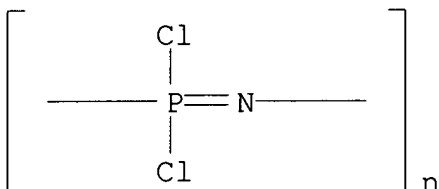
IT **26085-02-9**
 (reactions of, with sodium salt of (methoxyethoxy)ethanol, poly(methoxyethoxyethoxide)phosphazene from)
 RN 26085-02-9 HCA
 CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



CC 76-1 (Electric Phenomena)
 Section cross-reference(s): 35, 36, 37, 68, 72
 ST **electrolyte** polymethoxyethoxyethoxidephosphazene complex lithium; **battery** solid **electrolyte** lithium complex; cond polymethoxyethoxyethoxidephosphazene complex lithium; phosphazene methoxyethoxyethoxide polymer lithium cond
 IT **Batteries**, primary
 (solid **electrolyte** for, lithium salt complexes with poly[bis(methoxyethoxyethoxide)phosphazene])
 IT **26085-02-9**
 (reactions of, with sodium salt of (methoxyethoxy)ethanol, poly(methoxyethoxyethoxide)phosphazene from)
 L43 ANSWER 41 OF 41 HCA COPYRIGHT 2005 ACS on STN
 101:171911 Polyphosphazene solid **electrolytes**. Blonsky, Peter M.; Shriver, D. F.; Austin, Paul; Allcock, H. R. (Mater. Res. Cent., Northwestern Univ., Evanston, IL, 60201, USA). Journal of the American Chemical Society, 106(22), 6854-5 (English) **1984**. CODEN: JACSAT. ISSN: 0002-7863.
 AB The phosphazene polymer NP(OC2H4OC2H4OCH3)2n (I) was synthesized and amorphous solvent-free salt complexes were formed with LiSO3CF3, NaSO3CF3, Sr(SO3CF3)2, and AgSO3CF3. A material with the compn. (LiSO3CF3)0.25.I has cond. 8 .times. 10-5 .OMEGA.-1 cm-1 at 30.degree., which is much higher than corresponding poly(ethylene oxide) complexes. At 50.degree. the transference no. for Li+ is 0.32. The cond. of the Ag-contg. complex displays a max. at the compn. (AgSO3CF3)0.167.I. This max. conforms to the excess entropy model for ion transport in polymer **electrolytes**. The

phosphazene **electrolytes** are promising materials for ambient-temp. high-energy-d. **batteries**.

IT **26085-02-9DP**, reaction products with methoxyethoxyethanol sodium salt, complexes with metal salts
(prepn. and elec. cond. of)
RN 26085-02-9 HCA
CN Poly[nitrilo(dichlorophosphoranylidyne)] (8CI, 9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 36, 52
IT **Batteries**, primary
(**electrolytes** for, polyphosphazene-metal salt complexes as)
IT 2923-28-6DP, complexes with polyphosphazenes 2926-30-9DP, complexes with polyphosphazenes 7791-03-9DP, complexes with polyphosphazenes 19278-10-5DP, reaction products with poly(dichlorophosphazine), complexes with metal salts 25322-68-3DP, complexes with polyphosphazenes **26085-02-9DP**, reaction products with methoxyethoxyethanol sodium salt, complexes with metal salts 33454-82-9DP, complexes with polyphosphazenes 55120-74-6DP, complexes with polyphosphazenes (prepn. and elec. cond. of)

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FILE 'REGISTRY' ENTERED AT 14:29:11 ON 15 DEC 2005

L44 6099 S 46.716.5/RID

L45 42 S L44 AND L24

FILE 'HCA' ENTERED AT 14:32:26 ON 15 DEC 2005

L46 29 S L45

L47 0 S L46 AND (L16 OR L18 OR L19)